

ELECTRICAL OUTAGES

HEARING
BEFORE THE
COMMITTEE ON
ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE
ONE HUNDRED TWELFTH CONGRESS

SECOND SESSION

TO

RECEIVE TESTIMONY ON WEATHER RELATED ELECTRICAL OUTAGES

APRIL 26, 2012



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ELECTRICAL OUTAGES

THURSDAY, APRIL 26, 2012

U.S. SENATE,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, DC.

The committee met, pursuant to notice, at 9:54 a.m. in room SD-366, Dirksen Senate Office Building, Hon. Jeff Bingaman, chairman, presiding.

OPENING STATEMENT OF HON. JEFF BINGAMAN, U.S. SENATOR FROM NEW MEXICO

The CHAIRMAN. First let me indicate Senator Shaheen and Senator Blumenthal have both spoken to me repeatedly about the importance of this hearing. They're much of the impetus for us having this hearing. I thank them for that.

In late October 2011 an early snowstorm dropped as much as 3 feet of snow on East Coast States resulting in widespread power outages. Only a month before that Hurricane Irene had done extensive damage to electricity systems in the same region. Today's hearing is going to look at these and other weather related events in order to inform the committee as to whether actions are necessary to improve preparation for and response to such events.

We'll hear from the Department of Energy which has a significant role in gathering and communicating data during and after electrical emergencies.

We will hear from FERC, who is conducting an investigation along with NERC on the outages that resulted from the October snowstorm in New England.

We'll also hear from those who were on the ground in New Hampshire and Connecticut during the event and the ones that preceded it.

Weather related outages are often almost entirely distribution level events. That does not mean, however, that we at the Federal level have no concern over these kinds of events or no role in helping to prepare for them or respond to them. We know that there have been many other weather related electricity system emergencies over the last few years.

Tornadoes caused damage in Texas, Alabama and the Midwest. Hurricanes along the Atlantic and Gulf Coast, storm related damage in Washington State in the Northwest. All of these have cost lives and property and economic loss.

It seems to me these kinds of events happen more frequently than they did in years past. But it is difficult to be sure of that

since increases in reported outages may be caused by actual outages or may be caused by increased reporting.

I'll be interested to hear how the reporting systems for these events work, and whether or not they can be improved.

I also look forward to the recommendations of the witnesses for ways to improve our communication and response systems to these emergencies.

Let me call on Senator Murkowski for any comments she has before we hear from our witnesses.

**STATEMENT OF HON. LISA MURKOWSKI, U.S. SENATOR
FROM ALASKA**

Senator MURKOWSKI. Thank you, Mr. Chairman.

As you mentioned we're scheduled to hear testimony on grid reliability in light of the power outages that we saw in New England last October after a historic event there. Alaska has had its share of historic weather. We beat all of our snow records certainly in Anchorage and in many communities in South Central.

The National Guard was called out to help uncover or dig out the community of Cordova. They got 18 feet in the course of a couple weeks there. I think they ended the winter at 25 feet of snow. So it's been a long, tough winter. The good news for us is that it's melting.

But we are here to talk about what role we may have in dealing with power outages when we have these weather events. It does appear that many of New England's weather related problems last fall were at the local level. I am, perhaps, a little concerned that we may be blurring the lines between our proper Federal role in overseeing the bulk power system and the historic State role in maintaining the distribution system.

I do understand that FERC working with NERC has an ongoing inquiry into the New England situation. There's a final report that's expected just about 4 weeks from now. Possibly we would have been better served with this hearing had we waited until that report was finalized because we could have seen what that Federal nexus is for a full committee hearing. But we would also have had the benefit of our grid regular's findings and recommendations.

But we're here this morning. We must thoroughly examine our responses to storm caused outages so that we can plan better and prepare for the next emergency because we know that there's going to be another storm that comes our way that will drag down the power lines.

New England got hit with a record storm only 2 months after Hurricane Irene. The Northeast got knocked again this week with a late spring snow. The problem that we face is whether we're talking hurricane, blizzard, tornado, whatever the act of God may be, we can't know for sure the extent and the challenges until it actually hits us.

But in working to ensure the reliability of our Nation's grid there are some challenges that we can't foresee and for which we can take preventative action. I've spent considerable time this Congress asking both FERC and EPA to balance electric reliability needs with the suite of new Federal rules regulating power plant emissions. I'm now working on safety valve legislation so that the cu-

mulative effect of these Federal regs does not threaten electric reliability.

Today I'm hopeful, Mr. Chairman, we will have enough members before the committee to consider the two FERC nominees, Commissioner Norris and Mr. Clark. If they are approved by the full Senate I expect both Commissioners to uphold FERC's electricity reliability mandate, especially if another agency's regulations could adversely impact our Nation's grid.

Commissioner Norris has told us that he has, "encouraged EPA to consider the cumulative impact of their regulations." But unfortunately I don't think that that's good enough. Only 2 weeks ago the President established a national interagency task force on shale gas development to ensure the Federal regulations are well coordinated and are not duplicative. I don't think that we need an executive order to get our agencies to work together. But perhaps we need one to maintain electricity reliability.

At the very least, I do hope that FERC will immediately convene another technical conference to gather evidence regarding the cumulative impact of EPA's new power plant regs.

So I look forward to the testimony that we will receive today and hope that we can learn from those who have gathered.

Thank you.

The CHAIRMAN. Thank you.

As I indicated, both Senator Shaheen and Senator Blumenthal urged that we have this hearing and I know Senator Blumenthal would like to introduce one of our witnesses from Connecticut and Senator Shaheen introduce one of our witnesses from New Hampshire.

Why don't you go right ahead, Senator Blumenthal and make any statement you'd like to make.

**STATEMENT OF HON. RICHARD BLUMENTHAL, U.S. SENATOR
FROM CONNECTICUT**

Senator BLUMENTHAL. Thank you. Thank you very much, Mr. Chairman. I want to thank you personally for having this hearing.

I know that your leadership was instrumental and thank Senator Murkowski as well. But particularly Senator Shaheen, who has been a partner in this effort and who has been extraordinarily attuned to the challenges that her State of New Hampshire faced in the wake of these very unusual storms. I want to say at the very beginning that there are lessons here that can be learned by States across the country and I believe, strongly, by the Federal Government.

I have two recommendations in particular that come from the experience of the Connecticut Norwich Public Utilities which is represented here today by John Bilda and will be a witness before you. He will tell you about the Norwich Utility story which is a success story. That's why there are lessons to be learned from it.

While more than 800,000 consumers around the State of Connecticut after each of these two storms, Irene and then the October snow storm, suffered without power for days on end. Norwich restored power to 98 percent of their customers within 48 hours of Hurricane Irene. So I'm really delighted that Mr. Bilda, who has a strong background in public utilities will be here today to talk

a little bit about his first hand experience with restoring power in the wake of these catastrophic storms.

I have two recommendations.

I'm urging the committee to review the mutual assistance group process or shareholder owned utilities and enact measures ensuring that every State has ready access to an adequate number of line crews following a disaster. Part of this process is to prepare for the unexpected. The catastrophic eventualities that follow a hurricane or other natural disaster in terms of outages and a proper mutual assistance group procedure where line crews come from other States and are available in States that need them, I think, is absolutely essential.

Then second, I'm urging that the Federal Energy Regulatory Commission provide clear direction and incentives for utilities to establish microgrids which is really part of smart grid strategy. Microgrids that will help ensure that at least a portion of the town or city has some electricity during the next big storm.

After each of these storms, Mr. Chairman, I toured the State, day after day. What I found was senior citizens and families in shelters. There were more than 50 shelters in the small State of Connecticut.

There were people who went to hospitals in the wake of these storms because they had no power at home. They needed the power in hospitals simply to run their oxygen supplying equipment, if they needed it or other essential medical equipment. In the wake of each of these storms there were real life threatening emergencies that existed because power was out in whole cities across swats of regions. Microgrids are really a very, very important step toward ensuring that there is power in at least part of towns to provide essential services.

I want to be very blunt. We received strong aid eventually from mutual assistance groups after each of these storms. But it took time.

That's why the process needs to be strengthened so that there are some guarantees and some specific arrangements as the Norwich Public Utilities was able to do through its reaching out and establishing those relationships. Through the organization that actually Mr. Bilda heads which is a regional group in the New England area. That kind of mutual aid was very important to the work that he did.

On the issue of microgrids there is a real need for FERC to clarify and affirm that these microgrids are consistent with tariffs. I know this statement sounds highly bureaucratize and perhaps it is. But the fact of the matter is that our regional operating system has been as much an impediment to these microgrids by failing to clarify that they are consistent with the tariffs. It needs strong direction from the Federal Energy Regulatory Commission. I think that smart grids, microgrids that operate within a confined and discreet area are really part of our energy future.

I would close simply by saying that we need policies that encourage self managed, vertically integrated designs that realize the investments that are being made right now. Northeast Public Utilities or I should say more correctly the CMEEC, which is the organization that it is a part of, has invested \$40 million in the

microgrid in its area. The benefits can be realized only if ISO New England cooperates and clarifies and affirms that it is consistent with tariffs and FERC's direction is absolutely necessary to pursue that end.

These issues have much broader ramifications. We will be considering cyber security measures in the U.S. Senate, hopefully at some point this spring. One of the reasons for considering the cyber threats is the threat to our grids. One of the ways to make sure that we are protected is to make these microgrids serve parts of cities, parts of towns, regions that will offer even greater security if any of our grids, the major grids, are threatened and if outages occur.

So I think that there are many broader ramifications to the outages that we suffered during these storms.

Again, I want to thank you, Mr. Chairman, for having this hearing.

Thank Senator Shaheen for her leadership.

Thank you very much, Senator Murkowski, for being so receptive. I realize that the storms in Connecticut may seem tame to what you go through in Alaska. We can learn a lot from you as well. So thank you very much.

[The prepared statement of Senator Blumenthal follows:]

PREPARED STATEMENT OF HON. RICHARD BLUMENTHAL, U.S. SENATOR FROM
CONNECTICUT

Chairman Bingaman, Ranking Member Murkowski and members of the Committee, thank you for agreeing to hold today's hearing on weather related electrical outages. I appreciate the opportunity to say a few words about the impact two storms had on my home state of Connecticut with respect to grid reliability.

Based on the experiences of Connecticut's Norwich Public Utilities that you will hear later this morning and my personal experiences traveling the state of Connecticut listening to constituents and first responders tell me about the apparent failures of the existing Mutual Assistance Group process for shareholder owned utilities, I urge the Committee to:

- review the MAG system and enact measures ensuring that every state has ready access to adequate numbers of line crews during a disaster;
- urge the Federal Energy Regulatory Commission (FERC) to provide clear direction and incentives for utilities to establish micro grids, thus ensuring at least a portion of a town or city has some electricity during the next big storm.

You will hear today from John Bilda, General Manager of Norwich Public Utilities, a municipally owned utility located in Norwich, Connecticut. The federal government can learn a lot from Connecticut's municipally owned utilities in the state which restored power to 98 percent of their customers within 48 hours of Hurricane Irene.

I've asked John Bilda to be here today because his utility served as a model for the rest of the state during Hurricane Irene and an October snow storm. In the days leading up to these unprecedented storms, and in the hours during and immediately after, John and his team were executing emergency response plans that had been years in the making. As a result, Norwich was literally a beacon of light in a sea of darkness in Eastern Connecticut. There are reports of residents from neighboring towns driving to friends' homes and businesses in Norwich because it was the only town to restore power. I visited Norwich personally, and received a briefing from John and his staff. They're an impressive group. How were they able to do this you ask? I'll let John tell his story but I'm incredibly proud to that John is with us today.

A specific concern of mine during both storms involved these cooperative utility Mutual Assistance Groups or MAGs. MAG programs exist to support utilities in contracting for additional line and repair crews when in house manpower proved insufficient in the wake of a major outage. By providing an informal and ad-hoc network of regional utility-to-utility cooperatives, these groups typically function well in de-

delivering the necessary crews in the aftermath of major storms. However, neither of these storms were typical, and I saw firsthand the shortcomings on the part of the MAG system that contributed to the incredibly and inexcusable slow pace of recovery in many parts of the state hit hardest by the storms.

Not only did the system prove hopelessly inadequate in providing the necessary crews to fully implement the required restoration effort, the system itself remained opaque to many local and state leaders—an information deficit which further impaired nonutility clean-up and safety efforts. The failure of the MAG system, as experienced in Connecticut during the last two major storms, is of vital concern not only to my state but other states that may encounter similar system shortcomings.

The federal government should also explore methods to encourage the development of micro-grids and other policies that allow important sections of towns to generate their own electricity even when transmission lines are down. While individual buildings may have generators, micro-grids would allow for a more efficient use of electricity generation facilities while increasing redundancy of power and reliability.

We must ask, what can be done on a federal level to better prepare? Surely this won't be the last Hurricane Irene or the last time we face a massive snowstorm. Disaster dollar levels hit record amounts in 2011 resulting from extreme weather events all around the country. We must review the mutual aid systems and suggest improvements to communications and allocation of resources so there is an adequate response from all electric utilities, whether in Connecticut or elsewhere.

On August 26, 2011, in preparation for Hurricane Irene which would go on to devastate much of the Northeast approximately two days later, the state of Connecticut's Governor requested a pre-landfall emergency declaration from President Obama. All seven members of the Connecticut Congressional delegation supported this request which was immediately granted allowing for direct federal assistance to supplement state and local resources to prepare for what we knew was ahead. With the pre-land fall emergency declaration granted, the state's exemplary emergency management personnel went to work mobilizing their teams, their equipment and their supplies around the state in order to meet critical emergency protection requirements before landfall. The hard working men and women of the state's Department of Emergency Management/Homeland Security, in strong coordination with local emergency management personnel should be commended for their swift action, quick thinking and commitment to the people of Connecticut. I would also add that the Administration was very cooperative in assisting state officials and the state's Congressional delegation in preparation for Hurricane Irene.

With ample warnings and a State of Emergency declared by the Governor, Irene tore through Connecticut on August 28, 2011. And with strong winds and rains totaling more than eight inches in many parts of the state, the unprecedented storm left almost 800,000 customers without power in Connecticut alone. In East Haven, twenty homes were completely destroyed. The Wilbur Cross/Merritt Parkway, a major artery bisecting the state was closed from the New York State line to Interstate 91 in Meriden due to debris from the storm. The heavy rain and strong winds submerged a Bridgeport power substation and downed power lines from Stamford to Groton and from New Haven to Simsbury.

At its peak, power was out to between 81 percent and 100 percent of customers for the state's largest electric utility. Five days after the storm struck, 172,000 customers in Connecticut were still without power; and a full seven days after the storm passed wasn't much better with more than 100,000 customers still without power. Yes, the storm was massive but we can, and we must do better.

The power outages had, and still do have, significant ramifications for the small businesses forced to close for days, for the elderly who depend on electricity not only for their comfort but for their medical devices that require power and for anyone who was forced to live in darkness for days.

Let me share with you a line from a letter I received from Suzette McKenzie Willard of Bridgeport, the owner of a home based childcare business. "Dear Senator Blumenthal, as I sit down this morning to write you this letter, we still have no electricity; it is Friday, September 2nd, 2011, six full days since Hurricane Irene moved over our state". She goes on to say, ". . .the lack of electricity has significantly affected my ability to operate my business. . .I was forced to close the business for several days, thus losing vital income". Ms. Willard is not alone in sharing those feelings. Again, we can and we must do better.

As I traveled the state in the days and weeks following Irene meeting with state officials, first responders, mayors, residents and small business owners, I heard loud and clear the tremendous impact electric outages had on everyone. The loss of electricity for approximately 800,000 customers after the storm, and the more than 100,000 customers still without power a full week later, left many wondering how this could happen even. "How could this be", my constituents would ask.

But two months later, it happened again. On October 29, 2011, a severe winter storm again wreaked havoc on the state, and much of the Northeast. The storm dumped up to twenty inches of snow in some parts of Connecticut. Reports indicated that wind gusts as high as 38MPH added to the ferocity of the storm. The snow stuck to all objects, especially trees, which had not yet lost their leaves, and power lines. The weight of the wet snow, combined with soil still soaked from Irene, resulted in hundreds of thousands of trees being uprooted or losing limbs, devastating much of the electrical grid and blocking roads. At the highpoint, over 880,000 customers were without electrical power and power remained out in many areas for over a week. Complete restoration of power from this crippling storm took over ten days. These power outages and road blockages led to the closing of 480 schools in 95 districts and a week later, 19 school districts were still closed. The State also suffered damage to fuel stations and communications capabilities, at one point, over 35% of Connecticut cellular telephone sites down.

On October 31, 2011, President Obama issued an emergency declaration covering the entire State—all eight Connecticut counties. Officials opened over 58 shelters and 118 warming centers. Even ten days after the storm, 12 shelters and 46 warming centers remained open due to continued power outages.

And once again, I was back on the road visiting some of the hardest hit areas including Simsbury, West Hartford, Seymour and Ridgefield. The stories I heard were devastating. The residents I spoke with and the business owners I met were once again forced to wonder, but how could this be? I was asked, “how were we not better prepared” for a storm of this magnitude and with ample levels of warning. I again applaud the state’s emergency management personnel. They were prepared—as always—for this type of disaster. But many of the state’s shareholder owner utilities were not.

Thank you again for having me here today. These are important issues to discuss and I’m grateful for the opportunity to share Connecticut’s experiences during Hurricane Irene and the late-October 2011 snowstorm.

The CHAIRMAN. Thank you.

Senator Shaheen, why don’t you go right ahead and introduce whoever you’d like at this point and make any statement you’d like.

**STATEMENT OF HON. JEANNE SHAHEEN, U.S. SENATOR FROM
NEW HAMPSHIRE**

Senator SHAHEEN. Thank you very much, Chairman Bingaman. I would like to echo Senator Blumenthal in thanking both you and Ranking Member Murkowski for convening the hearing today. As Senator Blumenthal said we started talking about our concern with what’s happening with the reliability of our country’s electricity grid after several weather related events last year, Hurricane Irene and then of course, the October snow storm that left about two million customers throughout New England without power, 315,000 of those in New Hampshire.

Looking at the news on a regular basis, it doesn’t take too long to figure out that it’s, at least in my recollection, it seems like we’re experiencing more frequent catastrophic weather related events. I think, Mr. Chairman, that you were going to be showing this chart from the Office of Electricity Delivery and Energy Reliability from the Department of Energy that really charts the increased weather disturbances since 2000. They’re significant with a significant impact on customers.

So given what appears to be happening my concern and I know it’s shared by Senator Blumenthal and by everybody on this committee, is that we look at ways in which we can encourage whether it’s through better standards or through incentivizing innovation for new developments in protecting our electricity grid that we really need to look at how we can address these outages. Because

it's no longer a situation where we think well, once in every 5 or 10 years we're going to get a significant weather event that's going to require being without power for a while. This has become a much more frequent occurrence and one in which, I think, we really need to look at how we can better prepare to respond to this.

Now I'm really pleased that on our second panel this morning we have someone from New Hampshire who has spent most of the last 10 years chairing the Public Utilities Commission in New Hampshire. Tom Getz was Chairman of the PUC in New Hampshire from 2001 until 2011. He recently stepped down.

I'm pleased to say that I appointed him to that position as Governor. He was reappointed again in 2007 by another Governor. So clearly it shows the excellent job that he did in that capacity. Before that he served as the Executive Director of our State's Public Utilities Commission.

I think he has a number of accomplishments. But one of them that I really wanted to point out this morning is that during his time as Chair of New Hampshire's Public Utilities Commission, one of the things that he did was manage an effort to create the New England State's

Committee on Electricity which is a regional committee approved by FERC to focus on resource adequacy and transmission planning. I think based on his experience he has a lot of expertise to share with us this morning.

So I look forward to his testimony and am delighted that he is here.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you very much.

We have as our first panel Ms. Patricia Hoffman, who is the Assistant Secretary for the Office of Electricity Delivery and Energy Reliability at the Department of Energy.

Please give us your views as to what we need to know on this subject. Then we'll have some questions.

**STATEMENT OF PATRICIA HOFFMAN, ASSISTANT SECRETARY,
OFFICE OF ELECTRICITY DELIVERY AND ENERGY RELIABILITY,
DEPARTMENT OF ENERGY**

Ms. HOFFMAN. Good morning, Mr. Chairman and members of the committee. Thank you for the opportunity to appear before you today to discuss the Department of Energy's roles and responsibility during weather related electrical outages. DOE plays a vital role coordinating with other Federal agencies in the energy sector to prepare for and recover from such outages.

With the increase of severe weather including the recent tornadoes in Texas and the Midwest and the approach of the 2012 hurricane season, this discussion is especially timely and important.

At the Office of Electricity Delivery and Energy Reliability our mission is to lead national efforts to modernize the electric grid, enhance the security and reliability of our Nation's energy infrastructure and facilitate recovery from disruptions to the energy supply. As a sector specific agency for energy under the Department of Homeland Security National Infrastructure Protection Plan our office works closely with Federal, State and local governments and industry to protect against and mitigate threats to the energy in-

frastructure whether they're caused by natural disasters, deliberate attack or human error.

DOE is also the lead agency for Emergency Support Function 12, also known as ESF12 for Energy, when activated by the Federal Energy Management Agency, FEMA, under the Disaster Relief and Emergency Assistance Act. In the event of an emergency we provide situational awareness. We coordinate response among Federal, State and local agencies and help facilitate restoration of energy systems.

When we are activated we have a team of responders who specialize in energy infrastructure and can be quickly activated and deployed to the event's location. These responders provide situational awareness, facilitate clear and consistent communication with other deployed responders and provide subject matter expertise to help with restoration and identify where the Federal Government can possibly engage in restoration efforts. We maintain constant communication with our Federal partners including FEMA, the Department of Homeland Security, Transportation, Defense, EPA, as well as State agencies and energy companies affected by the event.

Providing timely, accurate and situational assessments play a crucial role in helping other government agencies in industry prepare for and recover from power outages caused by these events. Reporting also allows the public to remain informed of the situation and plan accordingly.

During a major energy outage the situation typically changes very rapidly and information can often become conflicting and incomplete. As the storm moves through an area the number of customers without power can jump quickly. Following a storm as utility crews restore power outage numbers can change hourly as repairs are made.

With Hurricane Irene, for example, customer outages fluctuated dramatically over a 9-day period. Eighty percent of the customers in the Northeast were restored within 3 days.

During outage events energy companies focus on their specific service territories. States and local governments focus on their specific jurisdictions. Our situations reports are a definitive source for obtaining a broad, clear perspective on outage locations, scope, potential duration, looking at the entire affected region. These reports provide responders with sound information to determine where Federal resources should be applied to facilitate faster recovery and restoration.

DOE is keenly aware that the energy sector owns and operates a vast majority over our Nation's assets. Communication channels that we maintain with our private partners have been and continue to be invaluable when major outages occur. OE works closely on an ongoing basis with owners and operators of the energy infrastructure to communicate clearly and frequently about power outages and collaborating with them as they prepare for energy emergencies by conducting workshops, tabletop exercise and provide resources for energy assurance planning.

We also work closely with industry groups such as the Edison Electric Institute on the importance of their members to provide

timely, accurate and consistent data during recovery and restoration periods.

I would also like to briefly highlight the findings from our assessment from our recent improvements made by the energy sector. Our 2010 report entitled, “Hardening and Resiliency: U.S. Energy Industry Response to Recent Hurricane Seasons,” notes actions that industry has taken to harden their energy systems including replacing wooden poles with concrete or steel, strengthening pole with guide wires, elevating substations and control rooms, improving supply logistics. Companies have also deployed sophisticated sensors such as Phasor measurement units to evaluate the health of their systems and advance meters for outage management systems as well as other advanced technologies.

Integration of these smart grid technologies can reduce restoration times by detecting the location and the extent of damage and isolating the problem to keep the grid operating during an emergency.

Reporting timely, accurate and actionable information during emergencies is critical to helping Federal, State and local government agencies as well as the energy sector and Americans everywhere be more aware of the rapid evolving impact of severe weather events on the energy infrastructure and most importantly of all, remain safe.

This concludes my statement. Thank you, Mr. Chairman for your time. I look forward to answering any questions you and your colleagues may have.

[The prepared statement of Ms. Hoffman follows:]

PREPARED STATEMENT OF PATRICIA HOFFMAN, ASSISTANT SECRETARY, OFFICE OF
ELECTRICITY DELIVERY AND ENERGY RELIABILITY, DEPARTMENT OF ENERGY

Chairman Bingaman, Ranking Member Murkowski, thank you for the opportunity to appear before you today to discuss the Department of Energy’s (DOE) role in managing weather related electrical outages. DOE plays a vital role, in coordination other Federal agencies and industry to prepare for and recover from such electric power outages. Given the recent increase of severe weather incidents, including the recent tornadoes in Texas and the Midwest, and the approach of the 2012 hurricane season, this discussion is especially timely and important.

DOE’S ROLE, RESPONSIBILITIES AND AUTHORITIES

The mission of the Office of Electricity Delivery and Energy Reliability (OE) is to lead national efforts to modernize the electric grid, enhance the security and reliability of the Nation’s energy infrastructure, and facilitate recovery from disruptions to the energy supply. As the Sector-specific Agency for Energy, under the Department of Homeland Security’s National Infrastructure Protection Plan (NIPP), the DOE’s Office of Electricity Delivery and Energy Reliability is responsible for collaborating with Federal, State and local governments, and the private sector to protect against and mitigate threats on the energy infrastructure, be they natural disasters, deliberate attacks, or human error. OE performs the functions required under DOE’s authorities and Presidential Policy Directive (PPD)—8, National Preparedness, which is aimed at strengthening the security and resilience of the United States through systematic preparation for the threats that pose the greatest risk to the security of the Nation, including acts of terrorism, cyber attacks, pandemics, and catastrophic natural disasters. In addition, DOE is the lead agency for the National Response Framework’s Emergency Support Function 12 (ESF-12), Energy, when activated by the Federal Emergency Management Agency (FEMA), under the Robert T. Stafford Disaster Relief and Emergency Assistance Act.

In the event of an emergency, OE stands up its Emergency Response Center and has a team of responders that specialize in energy infrastructure who can be quickly activated and deployed to the location of an event. OE personnel then coordinate

with deployed personnel, other DOE offices, and Federal, State and local agencies in responding to the emergency. OE provides situational awareness and facilitates the restoration of energy systems. In addition, OE may provide technical expertise to utility companies, conduct field assessments, and assist government and private-sector stakeholders to overcome challenges in restoring the energy system.

REPORTING ON ENERGY EMERGENCY SITUATIONS

Reporting on emergency events plays a crucial role in helping other government agencies and industry prepare for and recover from energy outages resulting from these events. Reporting also allows the public to remain informed of the situation and plan accordingly.

OE takes great care in providing timely, accurate reports and situational assessments. When a major energy outage occurs, there is often a surge of information. Because the situation changes rapidly during these events, there are sometimes conflicting outage reports and incomplete information on damage status. In such cases, we must review and sift through large amounts of data and information to make certain that reported information is relevant, trustworthy, and accurate.

Through years of working closely with our Federal, State, local, and private partners in response to energy emergencies, OE has established proven procedures for evaluating and reporting outage data and situational assessments. OE maintains a team of trained staff at our DOE headquarters and field offices, which are prepared to assist in situational assessment, response, and reporting for any event. Procedures have been established for data collection, quality control, and reporting. These procedures are implemented for sudden events including unexpected severe weather (e.g., tornadoes, earthquakes, floods) as well as events such as hurricanes where we have the opportunity to pre-position staff and develop a timeline for data collection and reporting.

OE personnel use a standardized process for data collection, assessment, quality control, and reporting. The process is documented and repeatable and uses data sources that are fully referenced. As a result, we are able to provide high quality reports quickly and efficiently.

OE obtains data from a number of resources. Data on electrical outages are received through the OE-417 Form, "The Electric Emergency Incident and Disturbance Report," which provides timely information to DOE when utilities experience electrical incidents. We also collect information on damage to the infrastructure directly from energy companies such as utilities whenever possible. Many energy companies, including larger utility companies, now provide real-time outage information on their websites. We also use an in-house software tool which allows us to monitor the Nation's energy infrastructure in near real-time and create geospatial maps of the Nation's energy assets and systems that combine data from numerous sources into a single geographic information system (GIS). This system is known as the Environment for Analysis of Geo-Located Energy Information (EAGLE-I).

We also gather data and information from trained ESF-12 staff that have been deployed to the field, to FEMA, and to other locations during emergency events. These ESF-12 responders provide situational assessments and facilitate clear and consistent communication with other deployed responders. They also help to provide subject matter expertise to aid in restoration activities and identify where the Federal government can engage in restoration efforts if and when appropriate.

OE reviews all of the collected information, determines what information is relevant and appropriate to report, and evaluates the quality of the data source, and the date and time it was generated. If we identify discrepancies, we resolve them by investigating the discrepancy and determining which information is correct and current.

OE provides a situational assessment that includes State-by-State outage totals, the number and percent of customers without power, the scope of the damage within each State, utility restoration efforts, when restoration is expected to occur, whether any critical assets have been damaged, what response measures are being reported by ESF-12 teams, and what is being implemented by the energy companies. This information is then compiled into Situation Reports that are time-stamped and include references to all data sources. The Situation Reports are then made available to the public online (http://www.oe.netl.doe.gov/emergency_sit_rpt.aspx). The Situation Reports provide a snapshot of a given point in time, and are shared with Federal agencies responsible for making critical emergency response decisions. OE considers these reports as the Federal Government's official report on the scope of the damage and status of restoration at a specific point in time. These situational assessments facilitate decision making surrounding Federal response efforts and pro-

vide a much needed national perspective to State and local government as well as the private sector.

We recognize that actual outage numbers can change moment-to-moment during a given weather event. As a storm system moves through an area, the number of customers without power can change rapidly. Following a storm, as utility crews work to restore power, outage numbers will continue to change hour-to-hour as repairs are made. Figure 1* below is an example of customer power outages reported during Hurricane Irene and shows the rate of restoration over a nine-day period. As seen in the Figure, the majority of customers had their power restored within 3 days.

Situation Reports provide a common frame of reference on the severity, scope, and location of the impact. These situation assessments combined with our subject matter experts support decision making on when and if there is an appropriate role for Federal involvement in the restoration process. For example, the Situation Reports are used by FEMA and the U.S. Army Corp of Engineers to help determine where supplies of water, ice, food and generators should be delivered.

Because the energy sector focuses on their specific service territories during outage events, and States and local governments focus on their specific jurisdictions, OE's Situation Reports are a definitive source for obtaining a nationwide perspective on the outage, looking at the entire affected region and energy infrastructure as a system. The Situation Reports are considered a "one-stop" shop for energy infrastructure information.

Because OE understands the energy infrastructure, we are often called upon to help evaluate if requests for temporary waivers of certain regulations are warranted. The most frequent types of requests are to temporarily suspend Clean Air Act fuel requirements, use of foreign flagged vessels under the Jones Act, and to allow the interconnection of one utility to another under Section 202(c) and (d) of the Federal Power Act. We work closely with and provide the necessary due diligence to assist Federal agencies with evaluations of the severity and duration of the event and work with them to determine if waiver requests are justified.

DOE staff maintain constant communication with our Federal partners such as the Department of Homeland Security, including FEMA; Department of Transportation; Department of Defense; and the Environmental Protection Agency; State agencies in the affected area; and the energy companies impacted by the event.

OE provides a common frame of reference on the location, scope and potential duration of an event. This common frame of reference is critical for determining appropriate response measures. It enables us to communicate the presence of any critical infrastructure assets so they can be established as a priority in the restoration effort. It also gives those leading the response efforts sound information to determine where the application of Federal resources can facilitate a faster restoration.

ONGOING EFFORTS

DOE is very aware that the private sector owns and operates the vast majority of our Nation's energy assets. OE works closely with the owners and operators of the energy infrastructure, as well as State and local governments. Throughout the year, OE collaborates with these organizations to prepare for energy emergencies resulting from both weather-related and manmade emergencies. OE conducts workshops and tabletop exercises, provides resources and support for energy assurance planning, and facilitates relationship building across these organizations. The communications channels that these activities have fostered have proven to be invaluable when major outages occur.

We regularly evaluate our procedures to identify opportunities for improvement. On an ongoing basis, OE gathers information from public sources such as media outlets and creates a summary of public information about current energy issues. To help stakeholders stay current on energy infrastructure events, OE publishes the Energy Assurance Daily (EAD) to report on developments affecting energy systems, flows, and markets. The EAD is available to the public online (<http://www.oe.netl.doe.gov/ead.aspx>).

In an effort to continue improving communication and sharing of information, DOE works with industry groups such as the Edison Electric Institute, to emphasize the importance of providing timely, accurate, and consistent data by their members companies that is crucial during recovery and restoration periods. OE encourages industry to use terminology that is understandable to the response community and to the general public. We also stress the importance of company websites in providing continually updated information on those customers without power, locations

*Figure has been retained in committee files.

and restoration times. I would also like to highlight the follow-up that OE has done with private sector companies to ascertain the improvements they have made over the past several years, particularly since the 2005 and 2008 hurricane seasons. An OE report titled “Hardening and Resiliency: U.S. Energy Industry Response to Recent Hurricane Seasons,”¹ notes that industry has undertaken numerous actions to harden their energy systems by replacing wooden poles with concrete or steel, strengthening poles with guy wires, elevating substations and control rooms, and improving their vegetation management practices and supply logistics.

In addition, companies have taken innovative approaches to deploy sensors such as Phasor Measurement Units to determine the health of their systems. Companies are also making investments by installing composite poles, using infrared thermography to scan and identify problems on their transmission lines, and integrating smart grid technology.

Advanced smart grid technologies can reduce restoration time significantly. For example, the Electric Power Board (EPB) of Chattanooga, a Recovery Act Smart Grid Investment Grant recipient, is installing automated feeder switches, fiber communications, and sensor equipment for distribution circuits that can be used to detect faults and automatically switch to reroute power and restore other customers. In April 2011, severe storms caused power outages for three-fourths of EPB customers—129,000 residences and businesses. Smart grid technologies installed earlier helped EPB reduce outage time significantly by clearly identifying the location and extent of the damage. EPB was also able to avoid sending repair crews out 250 times. In September of 2011, another storm knocked out power to 59,000 homes and businesses. EPB determined that its smart grid technologies, in that situation, prevented an additional 25,000 customers from losing power.

In April 2011, Alabama suffered significant tornado damage. Southern Company, a Recovery Act Smart Grid Investment Grant recipient that has invested in smart grid technologies that improve outage communication and provide restoration notification during storms, had more than 412,000 customers without power as a result of the severe weather. Between Monday, April 27 and Wednesday, April 29, Alabama Power (a subsidiary of Southern) was able to restore power to over 200,000 of its customers. By the following Monday, May 1, 95 percent of the affected customers had had their power restored. Two days later, on Wednesday, May 3, restoration was nearly complete at 99.9 percent.

CONCLUSION

Reporting accurate, timely, and actionable information during emergencies is critical to helping Federal, State and local government agencies, the private sector, and the general public be more aware of impacts to the energy infrastructure and helping to minimize the impact of hazards.

As we move into the summer months, this year’s hurricane season and beyond, we remain vigilant and focused on our vital roles and responsibilities in reporting quickly and accurately on energy outages, working with our partners on response and restoration efforts, and keeping the American public informed. Although we hope the recent forecast for a light 2012 hurricane season is an accurate one, we are prepared for this year’s events and whatever they may bring.

This concludes my statement, Mr. Chairman. I look forward to answering any questions that you and your colleagues may have. Thank you.

The CHAIRMAN. OK. Let me start by asking a few questions.

We’ve got a chart that I think we were going to distribute around to folks called, “Major Electric Power Disruptions.” Have you looked at that chart?

Ms. HOFFMAN. I need to see.

The CHAIRMAN. OK. She’s bringing it to you there.

Do members of the committee have copies?

Why don’t you give them to folks here so everyone has got a copy?

At any rate the clear conclusion from this is stated right below the chart itself. It says, “Large scale electricity disruptions in the United States and Southern Canada have increased significantly

¹The report, “Hardening and Resiliency: U.S. Energy Industry Response to Recent Hurricane Seasons” is available at <http://www.oe.netl.doe.gov/docs/HR-Report-final-081710.pdf>

since the early 1990s even as changes in electric power generation have been modest.”

Do you agree with that conclusion?

Do you folks keep track of this kind of thing yourself in your office in the Department?

Is this something that is valid from your perspective?

Ms. HOFFMAN. We do keep track of the different weather events and the impact of those weather events across the United States. Whether they're increasing significantly I don't have our data to give you that information today. Looking at this is the NERC information with respect to outages that you've presented here.

But there has been stronger storms. There has been stronger tornadoes. There has been stronger snow storms.

So there is some, you know, some at least indication that there are some stronger events occurring in the United States.

The CHAIRMAN. Perhaps you could take this chart and review it after the hearing and see if there's anything in here that is questionable or misleading. If so, advise us of that or if you have better information we'd be anxious to see it.

Ms. HOFFMAN. OK.

The CHAIRMAN. Another issue is on reporting, particularly reporting of distribution level disturbances. The MIT Energy Initiative issued a study last December on the future of the electric grid. In that study they recommended the IEEE standard reporting metric for distribution level disturbances. They said that that should be followed uniformly throughout the industry.

It is not today.

Do you agree with that recommendation and do you have authority or the ability to try to see that that's implemented?

Ms. HOFFMAN. So let me start off. If I understand the standard it's the IEEE 1355 standard which looks at the duration and frequency of outages in the United States. It's an index of system average interruption frequency.

So it takes a look at the frequency, the number of customers interrupted as well as the duration. Then it makes it an index by dividing by the total customers in a service territory. What the IEEE standard did was it took that and broke it into two categories, major events and day to day events.

So that is a standard that is looking at trying to really pull together how do we start doing some correlations with outage events and day to day events. So the reporting of that should be looked at as a standard across the industry for reporting. It is perceived that there is inconsistent reporting mechanisms at this moment in time.

If we are going to move forward in correlating and looking at the impact as well as future investments that may be needed, we do need a standardized form to collect them.

The CHAIRMAN. Is there any action you can take in your position to implement this recommendation and see to it that these distribution level disturbances are uniformly reported?

Ms. HOFFMAN. We can use the information that is collected as following IEEE standard as one mechanism of making use of that information. We do not have enforcement mechanism nor do we have any requirements of enforcing that.

The CHAIRMAN. OK. Alright.

Senator Murkowski.

Senator MURKOWSKI. Thank you, Mr. Chairman.

Ms. Hoffman, thank you for your comments here this morning. This is an interesting chart that the Chairman has shared. I'm curious about that.

But I think we recognize that while we can have some pretty massive outages that are caused by weather and random weather patterns, we've also got the consequences of policy decisions. Those deliberate decisions that are made here in Washington. I have expressed a great deal of concern about this cumulative impact on reliability from this slew of EPA regulations that we're seeing that are coming out that impact and affect the energy industry that I don't believe are being adequately examined and considered.

Now, last year DOE did do an analysis of resource adequacy. But it was actually Dr. Majumdar who testified. He said that the report actually came from the Office of Policy and International Affairs in producing the report, not your office which is the Office of Electric Deliverability and Reliability.

It's further my understanding that not only did DOE fail to consider the entire suite of the new pending EPA regs that were forthcoming on the power sector, but they also did not consult with either the FERC or the NERC in that analysis.

So a couple questions to you along this line this morning.

First of all, why wouldn't it be the Office of Electricity Deliverability and Reliability that would head up this type of a review?

Ms. HOFFMAN. The report was done from the Policy Office because the Policy Office was looking at the impact of any policy recommendations or policy statements on the administration. Our office tends to look at, I will say, emergency related events, energy events on the system. We do the modeling and the analytics with respect to emergency events.

That's been our mission and our focus and looking at what is the technology to improve the energy infrastructure. Any potential impacts from weather or emergency events? Then how do we facilitate the recovery from those events.

hat's been the focus and the mission of our organization.

Senator MURKOWSKI. So you are suggesting that you look at those or intermittent or random impacts to the power generation as opposed to what policy impacts may come from other agencies?

I'm just trying to understand the difference here.

Ms. HOFFMAN. We work within our department to look at policy events, but we do not have the lead responsibility from the policy in the Department of Energy.

Senator MURKOWSKI. So do you have any idea why FERC or NERC would not be considered in an analysis of what you're doing with a focus on the impact of regulations coming out of other agencies on the electricity sector and the reliability of that sector?

Ms. HOFFMAN. I don't have the information to answer that.

Senator MURKOWSKI. Let me ask in another way then. Would your office, as the one that is tasked to look at the specifics of electricity deliverability and reliability, would you consider conducting an assessment of the cumulative impact of the regulations that are coming primarily out of EPA on the Nation's grid?

Is that something that you would consider doing?

Ms. HOFFMAN. We would consider doing or participating in any study or event that would be conducted either from the policy office, FERC, NERC or other agencies to the impact of reliability. Yes.

Senator MURKOWSKI. So you're saying you would participate, but you wouldn't take the lead?

Ms. HOFFMAN. If Congress requests us to take the lead and do the action we will be glad to take that.

Senator MURKOWSKI. But the concern that I have and I continue to raise is that this seeming inability to assess the cumulative impact of our regulations on the reliability aspect of the electricity sector is something that I think is extraordinarily important. Whether we're talking weather or whether we're talking policy, we need to know and understand that we've got a system that is in one piece.

I want to move very quickly. I mentioned, and it's public knowledge, that I've been working on safety valve legislation as it relates to our electricity reliability and the processes that we're dealing with.

One of the underlying problems that we have with the reliability is clearly transmission congestion, our inability to build out the transmission at an adequate pace. I believe you made a statement last week in a briefing to staff that generation can be built in 3 to 5 years. But if we're lucky it's about 10 years for the transmission lines.

Under the Utility MACT rule which requires compliance by 2015, it does allow for an additional year or perhaps two depending on some circumstances. I don't view that as an adequate safety valve.

So the question that I have for you this morning is this: Given this 10-year timeframe that you have indicated, is what we're facing as we try to build out transmission lines, doesn't a 3-year or even a 4-year or a 5-year window for compliance seem problematic given what we're dealing with with the timeframes that are involved here?

Ms. HOFFMAN. Thank you for your question.

I think what's going to end up having to be looked at is the case by case examples. There is flexibility in the system for extensions, for a fourth year extension. I believe a fifth year extension.

But the timelines are going to have to and any concern that a customer may or an owner/operator may have with respect to meeting those timelines, I think should be brought to EPA immediately. Be very transparent in the type of solutions that are being looked at and their timelines requested.

So that is probably going to be dealt with on a State-by-State basis, specifically with EPA.

Senator MURKOWSKI. So if you had to identify what you would consider to be a reasonable amount of time, you're saying that it's more on a case by case basis as opposed to 3 years or four years. Four years is reasonable.

Ms. HOFFMAN. I think it depends on the detail of the project and how far the project is along, what requirements are still necessary at the project. So I'm not going to do an average statement. I think

that it's best to look at the projects specifically and address that project's need with the proper agencies involved.

Senator MURKOWSKI. Mr. Chairman, I am well over my time. I apologize for that. I also apologize I have an Appropriations markup that began at 10:30. So I'm going to have to excuse myself.

I do wish that I was here for the other witnesses because I know that they have some interesting things to bring up as well.

So thank you, Ms. Hoffman.

The CHAIRMAN. Thank you.

Senator Shaheen.

Senator SHAHEEN. Thank you, Mr. Chairman.

Ms. Hoffman, I was a little confused by your response on the charts that Chairman Bingaman passed around. Because he quoted the commentary based on at the bottom of the chart that says, Major Electric Power Disruptions. That's attributed to the North American Electric Reliability Corporation or NERC and to EIA.

But the chart on the other side which I referenced earlier I have sourced as being your Office of Electricity Delivery and Energy Reliability. Is that your understanding?

Ms. HOFFMAN. Yes. I just had not seen these charts before right now. So I apologize. I'm looking at this for the first time.

Senator SHAHEEN. OK.

Certainly I understand that these are only a period of about 10 years. But just looking at the data reflected in these charts it certainly looks like the number of weather related disturbances has increased pretty dramatically as have the number of households affected by those. Would you agree?

Ms. HOFFMAN. It does look like that. But I will also say that prior to recently we did not have the outage management systems, the systems in place that can more accurately record some of the impacts to consumers. So it may be in the earlier years there may be some variances because of reporting that they didn't have the systems in place.

So I can only look at it without the data.

Senator SHAHEEN. Sure, that's only a snapshot.

Ms. HOFFMAN. Yes.

Senator SHAHEEN. I understand.

Talking about the concern for data collection and the need for standardized data collection are you comfortable that that standardized system of data collection is currently in place now?

Ms. HOFFMAN. I think we're heading in the right direction. Where we ultimately need to go is several layered type concept where utilities are first and foremost providing data to their consumers via the website and any text messaging and communications that are available. Because consumers need that actual information for safety of their customers so some of that entails the number of customers that are out.

I think it is very important for customers to understand the extent of damage to the system. So whether you're talking damage to the transmission system verses damage to the distribution system because that will give a better appreciation of the time for restoration. So that is at the utility level that must occur first and foremost.

Then from a State, regional, national perspective we need to be able to roll those numbers up to make sure that we get a regional perspective. Once again, I would go with the same philosophy.

The number of customers that are out.

The extent of damage to the transmission distribution to substation.

The extent of flooding.

Then the estimated timelines, if available, for restoration.

So everybody has a situational awareness especially customers that may need additional support or may need to go to a different facility if the timeline is going to be longer than expected.

Senator SHAHEEN. Is there a way to have the information reflect other potential issues with if it's transmission? I assume, at least my experience in New Hampshire, has been that most of our outages have not been the result of generation being down, but the result of transmission or distribution issues.

Is there a way to reflect whether those lines are aged, aging lines? That that's the cause of the outage in addition to the weather emergency so that they don't have the same kind of—you talked about the report on the industry response to hurricane season and some of the updated technology that is now being used. Is there a way to reflect that kind of information also in that data? Does it do that now?

Ms. HOFFMAN. It's a fantastic question. I think we're heading in that direction. That's what we need to continue to work toward is have a better understanding of assets and asset management health and age so that we actually can see if there's a correlation to say a feeder system, a part of the country where there may be more emphasis.

The risks may be more. There may be more of a risk to a future hurricane or event of that part of the system going down. So that we actually can look at predictive measures or measures that we can take in advance of a system knowing that maybe there's been a lot of stress in this region of the country, especially when you've had back to back storms.

When you've had back to back storms you've put an added stress on whether it's poles, trees. Then having another storm follow so closely after that can make certain elements weaker. So I think what it will allow us to do is to actually start saying, OK, how do we really want to take a harder look at investments and risk for different parts of the system whether it's putting guide wires, looking at reinforcing the poles, looking at strategies. Then be able to evaluate the cost impact and the impact to consumers.

Senator SHAHEEN. I'm out of time. But Mr. Chairman, if I could follow up just on the question that you raised. That is who should be the entity that actually describes and prescribes those kinds of standards and data collection?

Should it be FERC? Should it be NERC for us in the Northeast? Should it be the Department of Energy?

Ms. HOFFMAN. The standard process, I mean, it's an IEEE standard. I think the standards there's various standard setting organizations that are very well placed and structured to developing the standards in the United States.

Senator SHAHEEN. Maybe I wasn't clear.

What I should have said is who should enforce those standards? Ms. HOFFMAN. I think the enforcement of the standards is going to depend on who has jurisdiction. So from a State regulatory point of view it's going to be the State Utility Commissioners and the State Regulatory bodies. From the Federal perspective it will be FERC and NERC.

Senator SHAHEEN. Thank you.

The CHAIRMAN. Senator Cantwell.

Senator CANTWELL. Thank you, Mr. Chairman. Thank you for holding this hearing. Certainly, you know, while you're talking about a lot of Northeast outages, the Northwest has had quite a few outages, too.

As you know, over the past few years they seem to have multiplied. In January, we had nearly 300,000 customers across the Puget Sound region that were impacted. We're talking about outages lasting for many days. In fact I had one constituent who wrote me and said, "As we stretch into the fifth day of power outages with temperatures dropping into the 20s in the evenings I know this is the first major outage that most of the rest of the people have experienced so far this year. But it's the worst. So my power has gone out over 5 times in the last 30 days usually out for 24 hours."

So these are people who have been impacted many times. I'm certainly a big fan of what we've instituted, a new Doppler radar system that's state-of-the-art technology and now the rest of the Nation is implementing.

It's giving us more predictability. We need to do a lot more as we were talking about during last week's hearing on just the rise in sea level. We need to have a more weather ready Nation.

There are lots of things we can do to make sure that we have the information from a scientific perspective about what the impacts are going to be. Then how to actually plan for them. But you've got to have the information first. Then local governments, law enforcement, responders, everybody can develop the plan.

But in this case, over the last decade, we have seen a huge increase in these outages due to extreme weather events. Some estimates show a strong investment in the grid—in smart grid and distributed generation, in back up generation and things—that would help us basically diversify and build redundancy. Some people think that building that future system would cost somewhere between \$17 and \$24 billion a year over the next 20 years.

If you look at what that might actually reduce in estimated outages that are costing us somewhere over \$40 billion per year.

So how do you look at this issue from an investment perspective? I look at some of those numbers and say, geez, a 10-year investment in modernizing the grid. Getting distributed generation and getting some of these other investments in place, would pay back over a short time period, the cost that it is taking us to deal with all these outages, to say nothing of the impacts that they're having on consumers.

Ms. HOFFMAN. It's a very good point. With respect to the economic impact there is significant economic impact to the country during these events. I know that NOAA estimated that Hurricane

Katrina was 105, let me check out my units right now, \$105 billion in economic damage.

So it is how do we look at financing investments in the infrastructure over time to minimize the impact to the economy and also minimize any sort of impact from these events. So what we—what I would look at is a continued, steady improvement in our infrastructure. Acknowledging if we have better data and information than we actually can fine tune where the technology improvements can get the biggest benefit or the biggest impact, the biggest bang for the buck.

So what we really need to do is actually continue to collect the data and build the analytical capabilities so we can start developing those correlations and prioritize the investment in our infrastructure. So we can look at where do we get the most value from composite poles, from guide wires, from distributed generation and looking at microgrids. Where has the intensity of storms been increasing and look at should we be building the same and using the same technologies after a hurricane or should we be looking to place improved technologies on the system.

Right now when we rebuild it is the same technology that's being put back on the system to the extent that the costs are equal. So it is an investment strategy that has to go hand in hand with the developing of rate structures and rates at the distribution level.

Senator CANTWELL. But do you think that that number analysis, like a 10-year time period for payback is—do you think that's realistic, doable? Do you think it could be done sooner? What do you think?

I hear what you're saying. You want to do it smartly. You want to invest in the right technology. You want to see what matters.

But I feel like because of that the reason why you're here today and we're having this hearing is because a lot of people are frustrated that not enough is happening at the State and local levels. So we want to see more action. We'd love your agency to play a more leadership role, but you're talking about doing this incremental analysis.

I think what we have to get down to is some analogy, at least to maybe like weatherization and the investment we make in weatherization and the time period for payback. We have to start basically putting out there what we think, how quickly the investment will pay dividends to us. I think if we do, then we'll get much more aggressive results at the local level in pushing people to make these investments for us.

Ms. HOFFMAN. I agree with your point. The discussion is how fast should we invest and at what level can the consumer, the economy, tolerate with respect to that investment. The money that's required is significant. So how can, how should we plan for the investments that are required and manage those funding, difficult funding situations?

Senator CANTWELL. I think from our State's perspective we've had two of these—what someone would call 100-year events back to back—doing devastating economic damage to the State. Now you start talking about all sorts of businesses and industries that are impacted. You look at the tornado that may have hit the Boeing facility in the Midwest. As you know, these are all issues of, if we

are seeing more severe weather, how are we going to best prepare for it.

I think a grid that's much more reliable and resilient is going to be a key part of that. So I thank the Chairman for this hearing.

The CHAIRMAN. Thank you very much for your testimony. Unless there's additional questions why don't we go ahead to panel two? We'll dismiss you and thank you very much.

Ms. HOFFMAN. Thank you, Mr. Chairman.

The CHAIRMAN. If you do have any reaction to this chart that we gave to you we'd be anxious to hear that in the coming days.

Ms. HOFFMAN. We'd be glad to be able to provide you a response.

The CHAIRMAN. Alright. Thank you very much.

Let me call forward the second panel.

It's made up of Mr. Norman Bay, who is the Director of the Office of Enforcement of the Federal Energy Regulatory Commission. Let me just say since we've had very effusive introductions of the other two members of the panel. I want to say some effusive things about Mr. Bay.

He is a distinguished former U.S. attorney in the State of New Mexico and a former professor at the University of New Mexico Law School and does a tremendous job at every position he fills. We're glad to have him here. So Mr. Bay is our first witness in this panel.

Mr. Thomas Getz, who was previously introduced as the former chair of the New Hampshire Public Utilities Commission in Concord.

Mr. John Bilda is the General Manager with Norwich Public Utilities in Norwich, Connecticut.

Thank you all for being here.

Mr. Bay, go right ahead.

Yes, I think that's probably OK if the light is on. OK.

Why don't each of you take about 5 minutes. Make the main points you think we need to understand. We will include your full statement in the record.

Go right ahead.

Yeah, I think that would be best if you could just summarize it. Let's be sure the recorder has got it the way she wants it there.

Go ahead, please.

STATEMENT OF NORMAN BAY, DIRECTOR, OFFICE OF ENFORCEMENT, FEDERAL ENERGY REGULATORY COMMISSION

Mr. BAY. OK.

So we have engaged in a joint study with NERC looking into the October 29th through 30th, 2011 snowstorm in the Northeastern United States. We're about a month away from issuing our report. I think it's important to note, as the committee has recognized, that most of the customer outages around 95 percent were caused by damage to distribution facilities, the lines that deliver electricity to individual homes and businesses and that are regulated by the States rather than FERC.

Numerous affected States therefore have launched their own inquiries into the event. I commend their efforts. Although primarily a distribution level event the storm also caused transmission line and substation outages approximately 70 transmission lines, a

number of which are BPS or bulk power system elements, subject to FERC approved mandatory reliability standards, experienced sustained outages. That simply means an outage of more than 10 minutes in duration.

FERC and NERC launched their joint study to determine the causes of the transmission in BPS facility outages and to recommend steps that utilities could take to improve their performance in maintaining grid reliability during a future large snow-storm or other similar weather event.

So we've gathered a lot of data. We've done a number of interviews. We have worked with the State and public utility commissions in affected States.

We've done some outreach to them. We have done site visits. We're moving closer toward finalizing our report.

Before we finalize it, of course, we'll be doing more outreach to the State PUCs to get their feedback and their input. We'll be doing some outreach to trade associations as well.

While it's premature to discuss our findings and recommendations at this time, I would like to note the key issues that we're analyzing.

First, we're analyzing the effects of the storm on the specific transmission lines and substations that experienced outages. Which lines and substations were forced out of service. For what reasons and how long it took to restore those facilities.

Second, we are analyzing how these outages affected the BPS as a whole. How the BPS performed during and immediately after the storm.

Third, we are analyzing the affect of these facility outages on customers. We have already concluded that most of the customer outages were caused by distribution system damage.

Fourth, we are analyzing the role that compliance or lack of compliance with FERC approved, mandatory reliability standards, particularly the Transmission Vegetation and Management Reliability Standard, FAC003-1, played in the transmission outages.

Finally, in light of what we have learned we are considering making several recommendations on how utilities can improve vegetation management and other practices to reduce transmission outages during snowstorms and similar weather events. Although the effects of the transmission and substation outages on the BPS and on customers were mild compared to the serious distribution system outages, there is room for improvement in these areas.

So in conclusion I want to thank the committee again for this opportunity to testify today on FERC's study of the October 2011 snowstorm's effects on transmission and BPS facilities. We look forward to providing the committee and affected State governments a copy of the report when it is completed.

[The prepared statement of Mr. Bay follows:]

PREPARED STATEMENT OF NORMAN BAY, DIRECTOR, OFFICE OF ENFORCEMENT,
FEDERAL ENERGY REGULATORY COMMISSION

Mr. Chairman, Ranking Member Murkowski, and members of the Committee: Thank you for inviting me to testify today. My name is Norman Bay. I am the Director of the Office of Enforcement of the Federal Energy Regulatory Commission (FERC or the Commission). I appear before you as a staff witness, and the views I present are not necessarily those of the Commission or any individual Commis-

sioner. My testimony addresses FERC's inquiry into the effects of the October 29-30, 2011 snowstorm in the Northeastern United States on transmission and Bulk Power System (BPS) facilities. Commission staff is conducting this inquiry jointly with the North American Electric Reliability Corporation (NERC). The inquiry team has made substantial progress, but we are still about a month away from finalizing our report, so I am unable to share specific findings and recommendations at this time. I am, however, happy to discuss with you the nature of our inquiry and to speak generally about some of the key issues the inquiry team is analyzing.

The Committee is well aware of the severe nature of the October snowstorm and its harmful effects throughout the Northeast. To briefly summarize, the snowstorm dropped record amounts of heavy, wet snow across the Northeast when trees had not yet lost their leaves. These circumstances caused large numbers of trees to fall on distribution and transmission lines, resulting in widespread power outages. More than three million customers from Pennsylvania to Maine lost power, tens of thousands for more than a week. The storm caused significant economic impact in the affected states.

Most of these customer outages—around ninety-five percent—were caused by damage to distribution facilities, the lines that deliver electricity to individual homes and business and that are regulated by the states rather than FERC. Numerous affected states, therefore, have launched their own inquiries into the event, and I commend their efforts. Although primarily a distribution-level event, the storm also caused transmission line and substation outages. Approximately seventy transmission lines (a number of which are BPS elements subject to FERC-approved mandatory Reliability Standards) experienced sustained outages. FERC and NERC launched their joint inquiry to (1) determine the causes of these transmission and BPS facility outages and (2) recommend steps utilities could take to improve their performance in maintaining grid reliability during a future large snowstorm or other similar weather events.

FERC and NERC have gathered a significant amount of data, primarily from the utilities responsible for maintaining the transmission lines that experienced outages. We conducted site visits to view affected transmission lines in Connecticut, Massachusetts, and New Hampshire. We met with key executives of Northeast Utilities, whose subsidiaries had the most transmission line outages. We have also talked with staff from the relevant state commissions, and we will be presenting state commission staff with our preliminary findings and recommendations before finalizing the report.

While it is premature to discuss our findings and recommendations at this time, I would like to note the key issues we are analyzing. First, we are analyzing the effects of the storm on the specific transmission lines and substations that experienced outages—which lines and substations were forced out of service, for what reasons, and how long it took to restore those facilities. Second, we are analyzing how these outages affected the BPS as a whole—how the BPS performed during and immediately after the storm. Third, we are analyzing the effect of these facility outages on customers; as noted, we have already concluded that most of the customer outages were caused by distribution system damage. Fourth, we are analyzing the role that compliance (or lack of compliance) with FERC-approved mandatory Reliability Standards, particularly the Transmission Vegetation Management Reliability Standard (FAC-003-1), played in the transmission outages. Finally, in light of what we have learned, we are considering making several recommendations on how utilities can improve vegetation management and other practices to reduce transmission outages during snowstorms and similar weather events. Although the effects of the transmission and substation outages on the BPS, and on customers, were mild compared to the serious distribution system outages, there is room for improvement in these areas.

In conclusion, I want to thank the Committee again for this opportunity to testify today on FERC's inquiry into the October 2011 snowstorm's effects on transmission and BPS facilities. We look forward to providing the Committee, and affected state governments, a copy of the inquiry report when it is completed.

The CHAIRMAN. Thank you very much.
Mr. Getz, go right ahead.

STATEMENT OF THOMAS B. GETZ, FORMER CHAIR, NEW HAMPSHIRE, PUBLIC UTILITIES COMMISSION, CONCORD, NH

Mr. GETZ. Thank you, Mr. Chairman. I'm very pleased to be here this morning and have the opportunity to discuss New Hampshire's

experience with weather related electrical outages. I want to thank Senator Shaheen for her kind introduction.

I'll highlight some points from my written testimony.

First, for New Hampshire the defining event in terms of weather related electrical outages was the December 2008 ice storm. At that time 430,000 customers out of 690,000 business and residential customers, that's nearly two-thirds of all customers, were affected. Outages lasted up to 14 days. There were over 100, or there were over 1,000 field crews in the responding to that storm at its peak. There were \$150 million in reported damages from that storm.

Now that storm affected more than 4 times as many customers as any previous outage in State history. The previous high point had been approximately 100,000 customers during a snowstorm in 1996. But since December 2008 there have been 3 additional extreme weather events.

In February 2010, a wind storm with gusts in excess of 60 miles per hour over a wide swath of Southern New Hampshire caused outages to 360,000 customers. Restoration from that event took 6 days.

In August 2011, Tropical Storm Irene moved up the East Coast, as you well know. From a New Hampshire perspective the storm lessened in intensity as it moved northward and veered off its originally anticipated course. But nevertheless 160,000 customers lost power from that event. Restoration took 4 days.

Most recently, of course, in October 2011 with the Nor'easter, more than 300,000 customers in New Hampshire suffered outages. The restoration took 6 days.

Now the 4 events are distinguishable in terms of the cause. But the results were the same in that ice, wind, wet snow, all brought trees and branches in the contact with power lines causing widespread outages.

Now the obvious question from customers and from the public was an issue that we focused on in our After Action Review of 2008 were the electric utilities doing everything they should be doing in terms of paying sufficient attention to vegetative management? Now the issue of vegetative management is not a new one, as the committee well knows. The Northeast blackout from August 2003 that resulted in 50 million people losing power in the U.S. and Canada prompted Congress to pass the, as part of the Energy Policy Act of 2005, refinements to the way that the Federal Energy Regulatory Commission and NERC handled reliability standards.

At that time reliability standards made mandatory and enforceable. Once NERC was authorized as the electric reliability organization for the United States they submitted 102 proposed reliability standards including a Transmission Vegetation Management Program that they've recently updated in a filing to FERC that was made in 2011. It's designed to minimize encroachment from vegetation located adjacent to rights of way.

Just as Congress conducted a reappraisal in the aftermath of the blackout in August 2003 states, took a look at their policies with respect to vegetation management. In New Hampshire we approved new reliability enhancement programs that increase funding and annual spent by electric distribution utilities on tree trimming and encouraged shorter trim cycles, larger trim zones.

I would also like to note that I think it's important to observe in this context that the nature of preparedness was affected greatly by the events of 9/11. After 9/11 I think working relationships among utilities and commissions and State emergency management agencies was heightened. In New Hampshire then Governor Shaheen created an Advisory Council on Emergency Preparedness and Security which advises the Governor on issues involving State ability to respond to natural and human caused disasters.

PUC personnel, myself included, were trained in incident command system, part of Homeland Security's approach to national incident management system. It is in that role that the PUC intersected with the U.S. Department of Energy's Office of Electricity Delivery and Energy Reliability described by Assistant Secretary Hoffman.

Nevertheless the ice storm with its unprecedented scope and intensity greatly strained capacity of utilities to respond and revealed a number of system processes. The ice storm after action review that we conducted focused on a number of issues. I see my time is close to out.

So let me just summarize that we concluded that the tree trimming was not an issue creating to the number of outages at that time. That utilities were following established protocols. That the protocols themselves were appropriate.

But I wanted to make 3 general observations before I close.

One is a public expectations of utility and government action are understandably high in this regard because it involves fundamental issues of public health and safety.

I'd also like to say that extreme weather events are affecting large numbers of customers and coincident with what Senator Blumenthal mentioned, I think there's an emerging issue of competition for resources, especially when you see large events moving up the coast absorbing resources as they move. I think I have not seen a real problem as of yet because the utilities have worked together for a long time. But it's an issue that could bear some regional and perhaps some national attention.

The third thing and last is that the interconnected grid is a complex structure with overlapping jurisdiction from a number of entities. I'd like to say that I was very encouraged by Director Bay's comments in his written testimony which I had a chance to go through. It seems that they're taking all the appropriate steps in terms of process in taking a look at the transmission system as opposed to the distribution system.

So with that, I'd be happy to answer any questions I could.

[The prepared statement of Mr. Getz follows:]

PREPARED STATEMENT OF THOMAS B. GETZ, FORMER CHAIR, NEW HAMPSHIRE,
PUBLIC UTILITIES COMMISSION, CONCORD, NH

From October 11, 2001 until February 1, 2012, I served as Chairman of the New Hampshire Public Utilities Commission. In that role, I had the responsibility to ensure that public utilities provided safe and adequate service at just and reasonable prices.

My focus this morning is on my experience in New Hampshire during the past several years with electrical outages from four separate extreme weather events, each of which far surpassed any previous storm in state history in terms of the number of customers who experienced electrical outages. I am hopeful that New

Hampshire's experience with these events will prove useful to your consideration of weather related electrical outages.

In December 2008, approximately 430,000 customers, nearly two-thirds of New Hampshire's 690,000 residential and business electric customers, were without power, some for as long as 14 days, as the result of an unprecedented ice storm that affected 211 of the state's 256 municipalities and land grants. The effects of the ice storm were concentrated in the southern part of the state and also heavily impacted northern Massachusetts. The '08 Ice Storm, which saw up to an inch of ice accumulation on power lines and tree limbs, caused in excess of \$150 million in reported damages. Storm recovery was highly labor intensive, with over 1,000 field crews working during peak restoration hours, due to the sheer number of downed lines and broken poles and the resulting need to rebuild entire sections of some distribution lines.

In February 2010, a wind storm with gusts in excess of 60 mph over a wide swath concentrated in the more densely populated southern portion of New Hampshire caused outages to 360,000 customers. Restoration took six days, much less than experienced during the '08 Ice Storm, largely because the damage was more sporadic and did not require rebuilding of lines.

In August 2011, Tropical Storm Irene moved up the east coast affecting 12 states, the District of Columbia and three Canadian provinces, leaving about 7 million customers without power. The storm diminished somewhat in intensity as it moved northward towards New Hampshire and veered from the originally anticipated course. Nonetheless, 160,000 customers lost power and torrential downpours caused flooding in the northern and western parts of the state. Restoration took four days, involved in excess of 800 crews and was aided in part by favorable summer weather conditions.

In October 2011, an early season snowstorm, or Nor'easter, dropped more than two feet of wet, heavy snow on trees still in full foliage. As a result, more than 300,000 customers in New Hampshire and approximately 2 million customers in New England suffered electrical outages. Restoration took six days and involved nearly 1,000 crews.

Prior to these four very different events, the single largest outage in New Hampshire occurred during a snow storm in December 1996, affecting roughly 100,000 customers. While the four events were distinguishable in terms of meteorological causation, the results were the same in that ice, wind and wet snow all brought trees and branches into contact with power lines, causing widespread outages. The obvious question in such instances, the one asked by customers and public officials, and the one that was a primary focus of the New Hampshire Public Utilities Commission's After Action Review of the '08 Ice Storm is: Are the electric utilities paying sufficient attention to vegetation management?

The issue of electric utility vegetation management is not a new one as the Committee knows. On August 14, 2003, a tree in northern Ohio made contact with a high voltage transmission line causing the line to trip off and triggering a cascading event that affected 50 million people in the U.S. and Canada. In response, Congress passed the Energy Policy Act of 2005, which authorized the Federal Energy Regulatory Commission to create an electric reliability organization (ERO) and provided that reliability standards would be mandatory and enforceable. One outcome of that effort was the certification by the Federal Energy Regulatory Commission (FERC) of the North American Electric Reliability Corporation (NERC) in July 2006 as the ERO for the United States. Among other things, NERC, as part of 102 proposed reliability standards filed in 2006, adopted a Transmission Vegetation Management Program. More recently, in December 2011, NERC filed a revised transmission vegetation management standard with FERC designed to minimize encroachment from vegetation located adjacent to rights-of-way.

Just as Congress conducted a reappraisal in the aftermath of the August '03 blackout, individual states took a close look at the status of vegetation management practices. As a result, in New Hampshire the Public Utilities Commission (PUC) approved reliability enhancement programs that increased the funds annually spent by electric distribution utilities on tree trimming, and encouraged shorter trim cycles and larger trim zones.

It is also worth observing in this context the impact of 9/11 on the working relationships among electric utilities, public utilities commissions and state emergency management agencies. In New Hampshire, in response to 9/11 then-Governor Shaheen created an Advisory Council on Emergency Preparedness and Security, which advises the Governor on "issues involving the state's ability to respond to natural and human-caused disasters, and the preparation and maintenance of a state disaster plan."

The PUC has been an integral member of the Advisory Council from the outset, with a particular focus on critical infrastructure. PUC personnel, including myself, were trained in the Incident Command System, part of the U.S. Department of Homeland Security's National Incident Management System, which takes an all-hazards approach to natural or manmade disasters. In this role, the PUC intersects with the U.S. Department of Energy's Office of Electricity Delivery and Energy Reliability, which, through its Infrastructure Security and Energy Restoration mission, is responsible for coordinating the protection of critical energy assets and assisting state and local governments in executing the Emergency Support Function 12 Energy (ESF-12) established under the National Response Framework.

The PUC works closely with the state Division of Homeland Security and Emergency Management (HSEM) during an extreme weather event because of the critical nature of the electric system infrastructure to public health and safety. Prior to the opening of the state Emergency Operations Center (EOC), HSEM, PUC and electric utility personnel monitor weather reports as a storm approaches and communicate among one another in order to make preparations for response and recovery.

In an extreme weather event, the restoration of power is an end or goal in itself and the means for accomplishing other subsidiary goals. In the early hours of storm response, situational awareness is key to informed decision making by utilities and government officials. For example, it is necessary to identify the location and nature of outages, and ascertain estimated times of restoration at least preliminarily, and to coordinate closely so that state officials can, among other things, identify whether hospitals and other critical health and safety facilities are affected, and make decisions about closing and opening roads, determining where to open shelters, and determining whether to close schools.

The '08 Ice Storm After Action Review, which has served as a template for state and utility management in terms of lessons learned and corrective action, concentrated on a broader set of issues than vegetation management. The review included emergency preparedness and response, emergency planning, outage management systems, weather forecasting, resource procurement, resource deployment, restoration prioritization, and communications, as well as technical issues relating to system protection and line construction and loading, and the feasibility of overhead to underground conversion. At the time, the '08 Ice Storm was viewed as a high impact, low frequency event. That may still be regarded as an accurate assessment when narrowly limited to icing situations but the practical reality is that three other high impact events have occurred in the interim.

I think it is fair to say as a general matter from a New Hampshire perspective that, through actual hands-on experience, both state and local officials and utility management have become more adept at planning for, responding to, and recovering from extreme weather events that cause widespread electrical outages. As a specific matter, I offer no opinions on the actions of New Hampshire's electric utilities during the October '11 Snowstorm inasmuch as the PUC's after action review of that event is still underway. I do, however, offer some observations drawn both narrowly from the impact of the four extreme weather events in New Hampshire and broadly from the impact of the most recent event regionally.

First, public expectations of utility and government action are high when it comes to electric service and all that such service entails. New Hampshire is a heavily forested state so it is reasonable to expect that extreme weather events will damage trees, which will in turn damage power lines, especially distribution lines. Distribution lines are most at risk because they tend to run along streets and roads in close proximity to trees, which is a different case from higher voltage transmission lines where wide rights-of-way are the norm. At the same time, in addition to the traditional power-related amenities of heat and light, the public is more interconnected and reliant on electricity for connectivity for work, recreation and social interaction than in years past. Coincident with this heightened connectivity are heightened expectations. Electric utility customers today are seeking information on a virtually real-time basis about the cause of outages, the geographic extent of outages, the location of crews assigned to repair outages, and the timing of restoration. Public officials have corresponding expectations of utility management, as well as the expectation that utilities will avail themselves of state-of-the-art weather forecasting and modeling tools, outage management systems, and communications media.

Second, extreme weather events affecting large numbers of customers create a competition for resources, particularly in the form of line crews and tree crews, which has the potential for negative consequences. During the four recent events in New Hampshire, crews were brought in from around the U.S. and Canada to assist in restoration efforts. The various New Hampshire utilities relied on mutual aid arrangements with other utilities, affiliated companies, cooperative arrangements, and contracts with independent line and tree crews. Utilities in New Hampshire

and throughout the region have a long history of working together and sharing crews. Extreme weather events that cover a large geographic area and a long time frame, however, tend to absorb resources quickly, making crew acquisition increasingly challenging. Moreover, especially in the context of a storm that is accurately forecasted and that follows a predictable path, the incentive is growing for a utility to tie up resources early in order to respond timely to its customer needs. Inasmuch as these weather events cross state boundaries and often involve multi-state companies, a regional approach among state regulators and policymakers to working with utilities could go a long way to staving off potential negative consequences.

Third, the interconnected electric grid is a complex structure that crosses state boundaries and is subject to shared jurisdiction involving state and federal agencies. Furthermore, utility ownership is divided among public and private entities, the latter of which may involve a number of affiliates and subsidiaries of larger multi-state or multi-national corporations. As a general rule, state utility commissions have jurisdiction over the distribution of electricity while FERC has jurisdiction over the transmission of electricity. On a related note, NERC has responsibility for the bulk power transmission system and the New England Independent System Operator, Inc., a regional transmission organization (RTO), operates the region's transmission system on a daily basis, manages wholesale markets and oversees regional planning. The jurisdictional boundaries between the bodies and among the states, however, may not be bright lines and is complicated by the reality that a number of utilities do business in multiple jurisdictions.

As noted in the PUC's '08 Ice Storm After Action Review, while technically the utility industry differentiates between two systems, i.e., distribution and transmission, in practice there is a sub-transmission system, which operates similarly to a transmission system by delivering power to distribution substations. Sub-transmission systems may operate at voltages associated with FERC regulation but in New Hampshire the sub-transmission system, forming an important part of the backbone system, operates primarily at 34.5kV, which is associated with state regulation. Also, NERC authority with respect to the bulk power system is not fully congruent with FERC jurisdiction. The complexity of the system, the multiplicity of actors, and the differentiation of regulatory roles both by geography and voltage level raise the same challenges faced in the organizational design of every large corporation or agency. Specifically, because of a natural tendency toward subunit orientation resulting from specialized jurisdictions, communications among the states and between the states and FERC, NERC or the RTO can be challenging. When the respective regulatory missions are incongruent, a variety of integrating mechanisms, such as task forces or teams, can be used to ensure that regulatory bodies are working together and not at cross-purposes.

In closing, I have been asked on more than one occasion whether the high numbers of outages experienced in recent years in New Hampshire were less a consequence of the particular storms or more the result of a lack of tree trimming or proper pole and line maintenance by the utilities. Based on the increased emphasis on vegetation management since 2003, and the evidence collected as part of the extensive '08 Ice Storm After Action Review, I am persuaded that the high numbers of outages are linked to extreme weather and not to utility imprudence. I have also been asked about the likelihood that such storms will continue. Public Service Company of New Hampshire indicates that many New England weather experts believe that the cluster of recent storms is part of a pattern that could last several years. As a practical regulator, it was my position that utilities should be prepared at all times to respond to a variety of extreme weather events, which is why budgets for storm response have been increased over time and mechanisms have been approved to consider utility recovery of expenditures in excess of budgeted amounts in appropriate circumstances.

Regulation often requires a balancing of competing policy objectives, of exercising regulatory oversight but avoiding counter-productive micro-management. Electric utilities have been highly regulated entities for a century as an economic matter because they historically operated as a natural monopoly and as a matter of public health and safety because they were so affected with the public interest by virtue of the fundamental and pervasive service that they provide. Accordingly, it is proper to look closely at the performance of utilities to determine whether they are acting prudently and to hold them accountable to meeting reasonable standards. That is the course the PUC has followed in New Hampshire with respect to weather related electrical outages as exemplified by the After Action Review of the '08 Ice Storm and continued through subsequent extreme weather events. It is also an appropriate course for FERC and NERC to follow with respect to regional events that impact the electric transmission system.

The CHAIRMAN. Thank you very much.
Mr. Bilda, go right ahead, please.

**STATEMENT OF JOHN BILDA, GENERAL MANAGER, NORWICH
PUBLIC UTILITIES, NORWICH, CT**

Mr. BILDA. Good morning, Senators. Thank you for asking me to summarize my written testimony before you here today.

My name is John Bilda, General Manager of Norwich Public Utilities, a municipally owned natural gas, water, sewer and electric utility serving Norwich, Connecticut and surrounding communities. Norwich Public Utilities was established in 1904 by forward thinking city leaders, who believed that owning and operating a municipal utility was in the community's best interest. We are governed by a 5 member board of utility commissioners appointed by the Norwich City Council, who are responsible for ensuring the utility is acting in the best interest of its consumers.

Our Board Chairman, James Sullivan, is also here with me today in the audience.

I am here to discuss our experience with electric restoration efforts following disaster events, specifically our response to Tropical Storm Irene. We deal with diverse emergencies and have an aggressive system in place to maximize reliability including a routine tree trimming program. Our system inspection program includes infrared inspections and pole integrity examinations. We invest in new technology to advance our ability to provide service.

We deployed 32 miles of high band width, fiber optic communication lines that link the entire city communication network including our ability to monitor and operate substation connections with the transmission system. Since we own this asset we don't have to rely on third party telecommunication operators for this critical communication component.

We work with city departments and emergency first responders to maximize resources, improve communications, eliminate unnecessary redundancies and streamline processes.

We relocated and upgraded the city's Emergency Operations Center to our Utilities Operations Center placing important stakeholders in one location ensures consistent and effective communication during emergencies.

Internally we have a positive working relationship with our unionized work force. We negotiated changes in job descriptions for our underground construction crews and cross trained them to work as support staff for our electric line crews. We can now double our restoration capacity, in house, by pairing line crews with construction crews.

When a major disaster affects Norwich electric distribution system we can expand our work force internally before relying on outside mutual aid. Our employees live in our community. Possess local and institutional knowledge of the system which makes a marked difference in an emergency.

We are members of Northeast Public Power Association or NEPPA, which supports our request for mutual aid when needed. NEPPA has a mutual aid system where New England based, public power systems support each other in times of need. As the current President of NEPPA, I can tell you that although the system works

well, we are constantly looking at ways to improve its effectiveness including further leveraging technology to quickly and efficiently fulfill mutual aid requests.

The system works because of the good faith and mutual understanding created over the years amongst public power communities. In short all NEPPA members know that they are no more than a few hours away from the assistance to restore power to their community.

When the regional electric transmission lines go down or are damaged no amount of crews can help us restore the power. We receive our electricity through transmission lines controlled by the independent system operator and transmission owners. One strategy we initiated to keep the lights on in Norwich when the transmission lights go down was to build a microgrid.

In an emergency our microgrid can supply a significant portion of normal power to our community. We want to expand this system but are facing regulatory hurdles at ISO New England that affect our ability to bring new assets online. I understand FERC's Office of Enforcement has been asked to review our scenario and issue their assessment on the use of microgrids so our system can operate with regulatory certainty.

So in conclusion we proactively develop policies that enable us to employ our own resources first to rapidly restore power.

We can further expand our work force uses NEPPA's well coordinated and effective public power mutual aid system.

Additionally we have taken steps to protect our community from prolonged power outage due to situations outside of our control.

As a public power system we value our men and women employees and have a successful business model that places our communities' needs first.

Again, thank you for allowing me to speak here with you this morning.

[The prepared statement of Mr. Bilda follows:]

PREPARED STATEMENT OF JOHN BILDA, GENERAL MANAGER, NORWICH PUBLIC UTILITIES, NORWICH, CT

Good morning Senators, thank you for asking me to testify before you today. My name is John Bilda, and I am the General Manager of Norwich Public Utilities, a municipally owned utility located in Norwich, Connecticut. We are a four service utility company, providing natural gas, water, sewer, and electricity to the people of Norwich and the surrounding communities. Norwich Public Utilities was established in 1904 by forward-thinking Norwich city leaders who believed that owning and operating a municipal utility company was in the best interest of the entire community. We are governed by a five member Board of Utility Commissioners who are appointed by the Norwich City Council. Our commissioners are responsible for ensuring the utility is consistently acting in the best interests of our customers and the community.

I am here today to discuss our experience with electric restoration efforts following disaster events, specifically, our response to Tropical Storm Irene in August of 2011. When Irene was making her way up the east coast, all of New England was preparing for the worst. However, we at Norwich Public Utilities had been preparing for this type of event for many years. Because we are a four service utility company, we regularly deal with diverse weather and non-weather related emergencies. We plan for circumstances that cause service interruptions to any or all of the utility services we provide. It is our job and responsibility to ensure that when an event impacts our customers, we act immediately and do what is necessary to control the situation and restore services as soon as possible.

We have an aggressive system in place designed to maximize reliability. Preventative system maintenance, a key component in our operating budget, is designed to ensure operational reliability. We understand a small investment in preventative maintenance will help avoid larger expenses later during emergency situations. For example, our vegetation management program is constant. In addition to routine tree trimming throughout our service territory, through close community ties with our customers, we respond to individual requests to examine and remove trees and brush that interfere with power lines. We have a very comprehensive system inspection program in place that includes infrared inspections and pole integrity examinations. We invest in new technology to advance our ability to provide service. Over the last several years, we have been mapping our territory using advanced Geographic Information System (GIS) technology. This allows us to prioritize and respond to outages more efficiently.

Part of our planning also requires building relationships with various entities that are crucial in aiding us in our mission. These entities include employee bargaining units, other municipal departments, first responders, city and local officials, and industry peers. Most importantly, it is critical to build a solid relationship among employees. From these relationships come a wide variety of resources and a strong sense of collaboration.

We have worked with various city departments and emergency first responders to develop a process to maximize inter-departmental resources, improve communications, and operate efficiently by eliminating unnecessary redundancies and streamline processes. We were instrumental in relocating and upgrading the City of Norwich's outdated Emergency Operations Center to our Utility Operations Center. By doing this, we centralized all major stakeholders involved in emergency response—fire, health, police, public works, etc.—and provided a state-of-the-art GIS and outage management system, equipment, and technical support needed to maintain the Operations Center during an emergency situation. Placing important stakeholders in one location ensured consistent and effective communication. Additionally, we developed plans with public works staff and first responders to work in cooperation with restoration crews. Rather than operating independently of each other, first responders work seamlessly with us to ensure safety while public works crews coordinate their efforts to open roads in support of our crews' need to restore service.

We also deploy 32 miles of high bandwidth fiber optic communication lines. These lines link the entire municipal communication network, including our ability to monitor and operate our substation connection with the transmission system. Since this is our asset, we do not need to rely on a third party telecommunications operator for this critical communication component.

Just as important as external relationships, we have developed a positive and constructive working relationship with our internal, unionized workforce. We currently have four crews of three electrical line workers who maintain all of the electric distribution lines in Norwich. Since we are a natural gas, water, and sewer company, we also have four underground construction crews. Twelve years ago, we negotiated with our construction unions to change the job descriptions of our underground crews and cross-trained them to work as support staff for our electric line crews. We can now effectively double our restoration capacity by pairing two electric line crews with two underground construction crew members in a supporting role, turning four, three person crews into eight four, person crews. We have regularly utilized this cross training model that has enabled our crews to develop the capabilities and competencies necessary to work safely and proficiently. When a major disaster affects Norwich's electric distribution system, we are now able to expand our work force for recovery efforts before relying on outside mutual aid crews. Our employees are highly valued, dedicated, and very skilled. They live in our community and possess local and institutional knowledge of the system. They are aware of the needs of the citizens and businesses of Norwich. That dedication and local knowledge makes a marked difference in an emergency situation, just as it does in normal operations.

There are times, however, where we require mutual aid. Tropical Storm Irene was one of those instances. We are fortunate to be a part of the public power fraternity and members of the Northeast Public Power Association or NEPPA, which supports our requests for mutual aid. NEPPA is the regional association representing 79 not-for-profit, consumer-owned electric utilities in the six New England states of Massachusetts, New Hampshire, Vermont, Connecticut, Rhode Island and Maine. NEPPA has established a mutual aid system where public power systems throughout New England can support each other in times of need. The system divides New England into four regions each with a mutual aid coordinator. Each coordinator is responsible for organizing mutual aid within their region as well as organizing their individual member companies' response to other regions in need of assistance. During

the Storm Irene event, NEPPA reached out to the abundant and similarly operated public power mutual aid programs in other regions and, within 24 hours, crews from North Carolina and Indiana were headed into northern New England. As the current President of NEPPA, I can tell you that even though this system works quite well, we are constantly looking at ways of improving our effectiveness. We are working on a project right now that will improve the system even more by leveraging technology to fulfill mutual aid requests more quickly and efficiently.

It is important to note that this public power mutual aid system works because of the good faith and mutual understanding created over the years amongst public power communities. I have a personal relationship with many of the general managers of the NEPPA member utilities. We have sent our crews all over New England and the east coast to respond in times of need. In short, all NEPPA members know they are no more than a few short hours away from the assistance they need to restore power to their community.

Even though Norwich Public Utilities does not own regional or “bulk” transmission lines, we are considered a part of the regional or bulk power system, subjecting us to Section 215 of the Federal Power Act. Section 215 created mandatory and enforceable federal reliability standards for the bulk power system. The bulk power system is comprised of transmission lines, power plants, and, in some cases, distribution utilities. The bulk power system is under the regulatory jurisdiction of the Federal Energy Regulatory Commission (“FERC.”) These standards do not prevent blackouts, as storms cannot be prevented, but rather they try to prevent unnecessary blackouts. They do this by empowering the North American Electric Reliability Corporation, or NERC, to set mandatory and enforceable standards for the bulk power system that can result in fines of up to \$1 million a day if they are not met. These standards are approved by FERC. As the concept of a bulk power system suggests, when regional electric transmission lines are damaged, restoring power is often outside our control.

There is one emergency where no amount of crews can help us restore power. That is when the regional electric transmission lines are damaged. As an electric distribution company, we receive our electricity through inter-and intra-state regional transmission lines that are not under our control; but that of the independent system operator and the transmission owners. In recent years, we proactively initiated strategies to keep the lights on in Norwich, even when the transmission lines serving our city go down.

As part of a larger, more comprehensive and integrated “smart grid” strategy, our wholesale electric supplier, the Connecticut Municipal Electric Energy Cooperative or CMEEC, constructed 16 distributed generation assets designed to provide 2.5 megawatts of power each, based on our dispatch needs—which can be used during emergencies. Norwich Public Utilities also owns a 20-megawatt combustion turbine that is used to provide power during an emergency. Collectively, all of our self-owned distributed generators can supply a significant portion of normal load (i.e., demand) should the need arise in an emergency (this is especially important considering the fact that water treatment and wastewater treatment assets in our municipalities cannot function without electricity.) With this effort, we have achieved much of the “micro grid” and “smart grid” visions as originally published in the Energy Independence and Security Act (“EISA”) of 2007, and as adopted by FERC.

We are seeking to expand this system, but we are facing regulatory hurdles at ISO-New England that are impacting our ability to bring new assets online and to preserve the existing ones. All power in New England is managed through ISO New England, which determines the terms, conditions, and costs of power and related services in documents called tariffs. The existing tariffs in place at ISO-New England are unclear about whether and when the use of such “micro grid” and “smart grid” designs are permitted. Distributed generation systems allow utilities to manage load on both a demand and supply basis, and thus, transmission costs on high-demand days, saving customers money when it is needed most. However, ISO-New England’s current policies limit or discourage such self-managed, vertically integrated designs, making it difficult and uncertain to realize the benefits for this investment. We have requested FERC’s Office of Enforcement to review our scenario and to issue their assessment to ensure consistent federal policies regarding the use of micro grids so that our system can operate with regulatory certainty. Until this issue is resolved, our strategic investment, made to actively manage customer load on a demand and supply side basis consistent with EISA and FERC, save our customers money, and ensure reliability in emergencies, will not be realized or expanded. We maintain an active and positive working relationship with the ISO-New England and FERC on these outstanding issues, and are hopeful we will receive a positive assessment.

In conclusion, we have proactively developed policies that enable us to rapidly expand our electric restoration crews employing our own resources first. We can further expand our workforce by utilizing a well-coordinated and effective mutual aid system through NEPPA and all public power utilities throughout New England. Additionally, we have taken steps to help protect our community from prolonged power outages due to situations outside of our control. As a public power system, we value our employees and have a successful business model that places our community's needs first.

Again, thank you for allowing me to speak with you today.

The CHAIRMAN. Thank you all very much for your testimony.

Let me ask a few questions and then defer to Senator Shaheen.

Let me ask you the same question I asked Ms. Hoffman about this recommendation from the MIT Energy Initiative Study on the future of the electric grid. They recommended there that the IEEE standard reporting metric for distribution level disturbances should be followed uniformly throughout the industry.

I guess I'd be interested in any of you telling me whether you agree with that recommendation. If it should be followed uniformly throughout the industry how do we get that done?

Mr. BILDA. Those standards are the one that Norwich follows and we submit that cooperatively to the State for reuse of work comparing ourselves on the national level with those standards right now. How that gets expanded across the Nation, something that would put everyone on a level playing field.

The CHAIRMAN. Right. But my question is how should it get expanded across the Nation? Should we have FERC doing this? Should NERC do this?

Mr. Getz, you're an expert on these matters having been at the State level. I know we love to keep our separate jurisdictions when we talk about energy distribution and transmission. But I think we need to find ways to keep those separate jurisdictions from interfering with getting to the right result. I'd be interested in your views as to how we could do that.

Mr. GETZ. I guess I'd say two things in that regard.

First of all uniformity across the States in a number of areas including reporting like that is critical on a State level, on a regional level and a national level. It seems to me the most direct route to implementing a standard like that would be through the NERC's Reliability Standards that they would consider it and then submit to FERC.

The CHAIRMAN. Do you know if they are considering that?

Mr. GETZ. I do not.

The CHAIRMAN. Mr. Bay, do you have any information on this?

Mr. BAY. I don't know whether NERC is considering that specifically. But under the Federal Power Act, section 215, FERC's jurisdiction and thus NERC's jurisdiction in turn, would not extend to distribution. So I'm not sure presently that either FERC or NERC would have the legal authority to require the reporting or certain kinds of reporting with respect to distribution related outages.

The CHAIRMAN. So Congress would have to change the law in order for us to have any kind of authority to require uniform reporting?

Mr. BAY. That would be my understanding. I would want to consult with the Office of General Counsel, obviously, at FERC. But as section 215 right now has a carve out with respect to the man-

datory reliability standards when it comes to distribution. So the reliability standards do not apply to distribution.

The CHAIRMAN. Let me ask also, Mr. Bilda, you obviously put in place a whole series of best practices. I would characterize them as in your utility which you're to be commended for. What can be done at the Federal level to try to ensure that the same kinds of best practices are implemented nationwide?

Mr. BILDA. In terms of the NERC standards a component of the NERC standards require a culture of compliance. That's something at least at the local level which makes the local utilities or public power very successful because of the culture of a small organization can be developed to meet those culture of compliance.

Expanding that, you know, through NERC, through the rest of the utilities, you know, may be a way in which, you know, some of the responses where they may not have been as rapidly as public power may be improved.

The CHAIRMAN. I guess on just as a follow up. I'm not real clear on what concrete action that you described there. I think expanding the culture of compliance is a good idea. I don't have any problem with that.

I just don't know. Is there some concrete action that you think ought to be taken by someone in either the FERC or NERC or Congress or anybody else?

Mr. BILDA. I really can't speak to that right now. I can speak to what works real well in Norwich.

The CHAIRMAN. OK.

Mr. Getz, did you have a comment on this or not?

Mr. GETZ. Only to say that you do run into the issue that Director Bay spoke to is when you've crossed over the line into distribution level requirements that are currently outside the scope of FERC jurisdiction. There would be some additional action would have to be taken.

Other than that it's through voluntary organizations like NARUC, regional organizations, that I've been a part of that you can encourage some commonality and uniformity. But to go beyond that would require perhaps some Congressional action of some sort.

The CHAIRMAN. Senator Shaheen.

Senator SHAHEEN. Thank you.

I want to pursue this a little bit more because Mr. Bay you pointed out that currently FERC does not have the authority to regulate standards for distribution. The question that I have is should it?

Mr. BAY. I think that's quintessentially the policy decision that Congress will have to resolve because there is—

Senator SHAHEEN. Oh, very diplomatically put.

Mr. BAY. As Mr. Getz points out historically there has been that divide between transmission, Senator Shaheen, and distribution. So the question is, you know, if Congress wants more data at the distribution level, you know, what if anything should Congress do.

I should footnote my answer, my previous answer with one remark and that is I don't know whether DOE has some separate authority that allows it to collect that information and whether there's something there that you could build upon. That I don't know. So I'm only speaking on behalf of FERC.

Senator SHAHEEN. OK.

Tom, I'm going to call you Tom for purposes of the questioning here. Should FERC have that responsibility or should some entity have the authority to say these are standards that should be followed with respect, not just to transmission but also to distribution?

Mr. GETZ. I certainly think there should be some distinguish between reporting and actual standards, so certainly to collect and report at a national level from distribution level utilities makes a lot of sense. Whether you're going to enforce the standards at the distribution level I think there may be a legal issue involved in doing that. But setting some minimum standards as a general matter makes a lot of sense.

As a policy matter I think you'd have to, again with any of these things, recognize to the extent that there might be regional differences, an issue we've always faced at NARUC. But requiring that some of these IEEE types of standards are minimums for utilities across the country, I think, is a very sound policy move.

Senator SHAHEEN. Mr. Bilda, recognizing that you have incorporated a lot of, as you pointed out the IEEE standards and are following some best practices that are commendable. How do we get others? If we don't have some sort of enforcement mechanism, some umbrella way to say to all distribution companies this is what you have to do.

How do we get other companies to do the kinds of proactive improvements that your company has taken on?

Mr. BILDA. I think in Norwich's case, you know, the accountability lies right with the community for us to perform. So I would expect as customers continue, you know, to experience maybe prolonged outages that may, you know, drive more accountability into some kind of standards cause the accountability for our organization is held right at the local level in terms of the standards and of the reliability of our system.

Senator SHAHEEN. Sure. For a co-op I can understand how that helps to drive policy. It's harder when you're dealing with an investor owned utility and consumers have no choices for where they're going to get their power.

So how does that play into decisions about how to ensure reliability?

Any of you want to respond to that? I mean, as the former chair of the Public Utilities Commission, how should Public Utility Commissions look at that issue when it comes to reliability? Is that a requirement that you can make for companies within your regulatory authority?

Mr. GETZ. Certainly a State commission can look at those issues and either through an adjudication or a rulemaking require that the regulated utilities take those kinds of actions.

Senator SHAHEEN. How common is that?

Mr. GETZ. In terms of the New Hampshire example after December 8 ice storm for instance. We took a look at a whole list of issues that came out of the storm in terms of, you know, going down to the issue of trim zones and trim cycles and how much is spent. So there are those opportunities. We took some of those actions.

But I think from State to State there's usually an initiating event like a major storm that prompts, kind of, a follow up action.

Senator SHAHEEN. My time is up, Mr. Chairman.

The CHAIRMAN. Why don't you go ahead and complete any additional questions you have? I don't have any more questions. So, go ahead.

Senator SHAHEEN [presiding]. OK. Just to follow up on this issue of data collection and reporting.

One of the things that we're considering or will be considering soon in Congress is a cyber security bill. I don't know if anybody heard the report on public radio this morning talking about one of the systems in our country that is most at risk for cyber attacks is our electric grid. We've been focused primarily on weather this morning but clearly there is the potential for a cyber attack to also take down an electric grid.

Do you see that, I guess, Mr. Bay, I'll ask you this question? Do you see that that issue should be treated differently than weather related emergencies with respect to requirements for data collection and reporting and best practices or should we be treating everybody the same? Given that, how do we resolve the issue of what happens at the distribution level?

Mr. BAY. I think that's a good question. It's also a difficult question as good questions often are.

The difficulty is that, again, our jurisdiction relates to elements of the bulk power system. So if you're talking about the local utility that serves retail customers we don't have jurisdiction over them nor does NERC. So that the reliability standards won't apply to them as well.

But clearly there is an issue there to the extent that there is a concern that a cyber attack could be launched at a local utility just as it could be launched at an element of the bulk power system.

Senator SHAHEEN. Right. I assume that could happen in a major metropolitan area in a way that would have a significant impact on the country. Is that?

Mr. BAY. I would assume that that is possible. There are many large utilities that suffer or not, that serve a retail customers in large metropolitan areas.

Senator SHAHEEN. Yes, Tom, did you want to respond to that?

Mr. GETZ. Yes, thank you. I read Richard Clark's book several years ago and it kept me up at night about the cyber war.

Senator SHAHEEN. Right.

Mr. GETZ. I think in terms of requirements of utilities I think in what we're talking about in terms of weather related outages from a legal perspective we're looking at what's the extent of the interstate commerce cause? What can the jurisdiction be when you get down to the distribution level? With terms to cyber security I think, you know, there may be a broader entrée from a legal perspective because it's ultimately a national security issue.

I also have a concern, a practical concern, from the State's level. It's an issue I had raised as a member of NARUC's Critical Infrastructure Committee that small States, especially, may not have the wherewithal to be really looking at issues of cyber security and make sure that the utilities are complying, are doing more than self certifying.

So to the extent that there is, can be, a Federal response, a congressional response, so I think it's very important in the area of cyber security.

Senator SHAHEEN. Thank you.

You talked about in your testimony finding after the snowstorm in October of last year that the utilities had complied with their requirements to trim vegetation in a way that was appropriate. That there was nothing inappropriate about their actions. So given that, are there other things that they ought to be looking at to be more responsive in weather related emergencies?

You mentioned, Mr. Bilda, cross training for your crews so that they could work both line and construction. Are there other technologies that we ought to be incentivizing our utilities to use in a way that will make them more efficient in responding in emergencies?

I'll ask you, Tom, if you would answer that first and then maybe Mr. Bilda you could talk a little more about other technologies that you're looking at that you think might be able to allow you to better respond.

Mr. GETZ. Yes, Senator.

First of all I'm going to reemphasize this point about distribution lines and trees along distribution lines. It's a very different situation from transmission lines that normally have wide rights of way and the likelihood of fall-ins is somewhat small. Distribution lines through neighborhoods there's always that tension between the aesthetics of a lovely neighborhood and reliability and how much tree trimming.

So there's always going to be that vulnerability to a lot of outages from distribution levels from trees.

But having said that there are a number of things we pointed out in 2008, the importance of state-of-the-art outage management systems for utilities to have so that they can know more clearly, more directly where the outages are. So then, because there are some utilities, a number of them, who don't really have below the transmission level, a really robust smart grid type of approach to knowing where the outages are in responding to them.

There's also a real need for better communications from utilities to local emergency management directors to the public. As, you know, there's a heightened expectations of the public. They want virtually to know in a real time way, you know, what's the cause of the outage? When is my power coming back? So I think, you know, more focus on social media is a way of communicating that to customers is a very important thing as well.

Senator SHAHEEN. Mr. Bilda, are there other technologies you're looking at?

Mr. BILDA. Yes, we actually have a GIS system, a Geographic Information System, in place on our community that the utility, our utility, operates on behalf of the city. That's linked directly with our Outage Management System. In the event of Storm Irene, when all this was working together in the city's Emergency Operations Center, we could actually coordinate where trees were down through public works and map all that and do all the prioritization work from the office so that our crews were dispatched as efficiently and effectively as possible.

Having said that, we are and a recipient of a DOE smart grid grant, of which we're maybe about 60 percent complete in the deployment of AIM metering which provides not only information out to the customers, but a whole bunch of information back into the utilities. We had some portion of that integrated in with the GIS and the Outage Management System where we were receiving meaningful and helpful information in terms of determining what's going on in the field without having to roll a truck.

Senator SHAHEEN. Wow.

Did I understand you to say that with respect to the microgrid you have a proceeding that is pending before Mr. Bay's office?

Mr. BILDA. Yes. There are, without traveling into too many details, we have asked. I understand we have asked through CMEEC, the Connecticut Municipal Electric Energy Cooperative, for some maybe, clarity in terms of conforming with a tariff that exists at ISO New England. So that, you know, our efforts to dis-ploy distributed generation out in our community and other municipal electric communities in the State of Connecticut to not only reduce demand, capacity demand during peak days and transmission demand during peak days, while at the same time providing for an emergency backup when other events occur.

Senator SHAHEEN. Just so that I am very clear on what you're talking about. When you're talking about a microgrid exactly what are you talking about?

Mr. BILDA. The deployment and dispatch of, in our case, they're small, two and a half megawatt generators that we've strategically located next to loads. That, you know, we can operate these generators and meet the need of the load while reducing the amount of energy that we take physically from the grid or the transmission system.

So it's a very, very localized generation system that, you know, the electrons physically flow just in the wires in the city of Norwich.

Senator SHAHEEN. Where does the generation come from for the distributed?

Mr. BILDA. It's from a, what they call a, RICE unit, a Reciprocating Internal Combustion Engine, that runs on environmentally high clean diesel with SCR emission equipment installed on them.

Senator SHAHEEN. OK.

So, Mr. Bay, without going into the particulars of this particular proceeding, can you talk about what the concerns are with respect to allowing this kind of microgrid to be used throughout the system?

Mr. BAY. I think the general concern, Senator Shaheen, that CMEEC has is whether the use of that microgrid or the distributed generation is perhaps inconsistent with the tariff in place with ISO New England. Again, without getting into the details, I can tell you that we are aware of this issue, that we have been meeting with CMEEC and indeed have a meeting scheduled with them in the next few days.

So we're having, I think, some productive discussions with them.

Senator SHAHEEN. Good.

This is just a sort of a general question. But as Mr. Getz and Mr. Bilda were talking about the recommendations for what could be

done to respond more quickly in emergency cases, they talked about technology, the cross training. To what extent are we seeing utilities adopting those kinds of new technologies?

Are there ways that we can incentivize this kind of activity? If there are concerns about the regulation side, are there ways that we can incentivize to help our utilities be able to be more responsive in these kinds of emergencies because, you know, while I appreciate what Ms. Hoffman said about not having full data, it certainly appears that we're going to be experiencing more and more of these kinds of events and given the high public expectations we need to figure out better, how to respond to them.

So I don't know, Mr. Bay, if you want to respond to that?

Mr. BAY. I'm a little bit out of my realm right now just because I'm with the Office of Enforcement not with the Office of Energy Policy and Innovation. We're in the Office of Energy Market Regulation.

But I can tell you, Senator, that FERC actually has different incentives in place for new technology. For example there are transmission rate incentives. There are other incentives that can be given for new forms of technology that incent the utility through a higher rate of return to adopt and to use those technologies.

I also know that in practice some of these innovations are making a difference. For example, there's something known as a phase angle regulators which are parts which are now being used by a number of utilities. Those are very helpful for system operators in terms of being aware of or having greater situational awareness.

So things are happening as Mr. Bilda and Mr. Getz indicated. I think those are positive developments.

Senator SHAHEEN. Thank you.

Tom or Mr. Bilda, do either of you want to respond?

Mr. BILDA. If I could add?

Senator SHAHEEN. Sure.

Mr. BILDA. If I could add to that though. If there isn't some kind of incentive or some kind of subsidization or some kind of value proposition in the ISO market or in some kind of market, you know, the microgrids or the distributed generation will not expand and flourish at all.

Senator SHAHEEN. Tom, I'll give you the final word here.

Mr. GETZ. Thank you.

The incentives that we apply at the State level is we doctor our investigations, bring the utilities in over the years, you know, going back to the Northeast blackout. We created these reliability enhancement programs, made it clear that the utilities could recover their investments.

We made it clear that budgets could be increased and to the extent that storms outside of what were expected might incur costs. There's an opportunity for them to come back in. So at this point it's almost on an annual basis that we're looking at what happened the previous year.

What was spent? Where are the capital budgets? Where are the O and M budgets?

You're seeing the utilities respond after storms and in some respects leap frogging one another in different ways in terms of their reporting systems, their outage management systems. So at that

level, I think, from New Hampshire's perspective, I've been very encouraged.

Senator SHAHEEN. Good.

Thank you all very much for your testimony and for being with us this morning. Obviously these are issues that we need to continue to work on. But appreciate your insights.

At this time I'll close the hearing.

[Whereupon, at 11:30 a.m. the hearing was adjourned.]

APPENDIX

RESPONSES TO ADDITIONAL QUESTIONS

RESPONSES OF PATRICIA HOFFMAN TO QUESTIONS FROM SENATOR MURKOWSKI

Question 1. During the FERC's Technical Conference on November 30, 2011, there was testimony by The Honorable Betty Ann Kane of the Public Service Commission of the District of Columbia and Ms. Debra Raggio, Vice President, Government and Regulatory Affairs, Assistant General Counsel, GenOn Energy, Inc., about the difficulties created by the conflict between an environmental order or orders applicable to the Potomac River Generating Station in Alexandria, VA and the need for that station to provide service to a nearby substation and/or otherwise to the electric system in and around Washington D.C. (See, e.g., FERC Technical Conference Transcript 11-30-11 pp. 324, 325, 333-337).

Please provide a summary of your office's role, and that of the Department of Energy more generally, in resolving that controversy. Please also provide a timeline of Departmental attention to the issues in that matter and detail the time that elapsed between the time when the problem came to the attention of the Department and the time when the controversy was resolved.

Answer. On August 24, 2005, in response to a decision by Mirant Corporation to cease generation of electricity at its Potomac River generating station, the District of Columbia Public Service Commission (DCPSC) requested that the Secretary of Energy issue a Federal Power Act (FPA) section 202(c) emergency order requiring the operation of the generating station in order to ensure compliance with reliability standards for the central D.C. area.

DOE has used section 202(c) to address various emergency situations, such as orders issued to allow generators in ERCOT to sell power to affected utilities in the aftermath of hurricanes Rita and Ike. Those orders were issued in a matter of hours by the Department acting upon its own motion without consultation with any other Federal or state agencies. The Mirant situation was fundamentally different in that the plant had ceased operation in response to a federally-authorized State agency action concerning violations of Federal environmental law, and there were no emergency events that presented an immediate threat to continuity of electric service in D.C. DCPSC's petition presented only a general claim that reliability was compromised without particular evidence or analysis. Faced with that situation, the Department conducted an independent reliability analysis, and began a process of consulting with the U.S. Environmental Protection Agency (EPA), and the Virginia Department of Environmental Quality (DEQ) on the environmental issues. The Department's analysis revealed that the real issue was not the immediate need for the plant's generation, but for its potential availability in view of limited additional transmission capacity to bring electricity into D.C. from elsewhere.

Upon completion of analysis, the Secretary made a determination that without the operation of the generating station there was a reasonable possibility an outage would occur that would cause a blackout in the central D.C. area. Therefore, on December 20, 2005, the Department issued a Federal Power Act section 202(c) emergency order requiring Mirant to operate the Potomac River generating station. The process DOE undertook in response to the DCPSC's petition included close collaboration and coordination with EPA, and the DEQ.

The order required Mirant to operate in a manner to reduce the risk to reliability, but not with unnecessary exceedances of required air quality standards. The expiration date on that order was October 1, 2006, but it was extended until February 1, 2007. On January 31, 2007, DOE issued a new section 202(c) emergency order to Mirant with substantially the same terms as the earlier order. That order expired July 1, 2007, pursuant to its terms.

Set forth below is a timeline of relevant actions. Pertinent documents are available online at <http://energy.gov/oe/does-use-federal-power-act-emergency-authority>.

- August 19, 2005—the DEQ issues a letter asking Mirant to take immediate steps to ensure protection of human health and the environment in the area surrounding the generating station, up to and including potential shutdown of the facility.
- August 24, 2005—Mirant shuts down all five generating units at the generating station.
- August 24, 2005—the DCPSC files an Emergency Petition and Complaint with both the United States Department of Energy (DOE or Department) and the Federal Energy Regulatory Commission pursuant to the FPA.
- August 2005 through December 2005—DOE conducts an independent analysis of the electricity reliability situation in D.C. and analyzes the generating station's role in ensuring a sufficiently reliable supply of electricity to that area, particularly given the lack of transmission capacity into D.C. DOE's analysis is conducted by the Department's Oak Ridge National Laboratory.
- December 20, 2005—Order No. 202-05-3 is issued. It orders Mirant to generate electricity at its Potomac River generating station pursuant to the terms of the order.
- January 18, 2006—DOE issues a notice of the emergency order (published in the Federal Register on January 20, 2006, 71 FR 3279) in which it commits to preparing a Special Environmental Analysis (SEA) pursuant to the Council on Environmental Quality's Regulations Implementing the Procedural Requirements of the National Environmental Policy Act of 1969 (NEPA), 40 C.F.R. 1506.11. The SEA is issued on November 22, 2006, with comments due by January 8, 2007.
- Order No. 202-05-3's original expiration date was October 1, 2006. Because the transmission redundancy problems continue in the absence of the completion of two new 230 kV lines in the process of being constructed by Pepco (the DCPSC regulated local utility), and because the SEA is not yet completed, two short-term extensions of the emergency order are issued pending consideration of the required SEA and review of comments thereon. The first extension, Order No. 202-06-2, is issued on September 28, 2006 with an expiration date of December 1, 2006. The second extension, Order No. 202-07-1, is issued on November 22, 2006, and with an expiration date of February 1, 2007.
- June 1, 2006—EPA issues an Administrative Compliance Order (ACO) pursuant to Section 113(a)(1) of the Clean Air Act (the "Act"), 42 U.S.C. § 7413(a)(1). EPA's order requires that the plant take steps to limit emissions while meeting the requirements of DOE's order.
- June 2, 2006—DOE issues a letter order to Mirant ordering it to operate in accordance with the terms of the ACO.
- January 31, 2007—Order No. 202-07-2 is issued. DOE considered the environmental impacts of the Mirant order based on the completed SEA and extended the emergency order until July 1, 2007.
- July 1, 2007—DOE order expires per its terms.

Question 2. Please identify the Departmental employees by position who led the effort or otherwise spent more than 20 professional hours attending to it.

Answer. Numerous DOE personnel were involved in various stages of the Mirant emergency order process, from the initial consideration and analysis through administration of the order. The personnel most closely involved were appointees and career DOE officials from the Office of Electricity Delivery and Energy Reliability and the Office of the General Counsel. The Assistant Secretary for Electricity Delivery and Energy Reliability and the General Counsel participated substantially in the emergency order process.

Question 3. Please outline your recommendations for improvements to the process undertaken in that case, and your recommendations for expansion or reform of the Department's authority to strengthen and streamline the Department's ability to protect electric reliability in the face of conflicts such as were present in the Potomac River case and similar issues or conflicts that may be present more generally in light of recently-issued and pending EPA regulations that may affect electric generating units.

Answer. DOE has used section 202(c) to address various emergency situations, six times since DOE's creation in 1978, most of which did not impact environmental laws. For example, in the aftermath of hurricanes Rita and Ike emergency orders were issued to allow generators in ERCOT to sell power to hurricane-affected electric utilities. As provided under section 202(d) of the Federal Power Act, operating pursuant to 202(c) orders provided the generators the ability to sell outside of ERCOT, while protecting them from being subject to FERC jurisdiction based on those emergency sales. Because of the urgency of the situation, those orders were

issued in a matter of hours by the Department acting upon its own motion without consultation with any other Federal or state agencies.

The Mirant situation in 2005 was fundamentally different in that the plant had ceased operation in response to a State agency letter concerning environmental violations. The D.C. Public Service Commission petitioned DOE to issue an emergency order to maintain reliability, but provided only a claim that reliability was compromised without any evidence or analysis. Faced with that situation, the Department began the process of consulting with the U.S Environmental Protection Agency (EPA) and State of Virginia on the environmental issues, and conducting a reliability analysis.

Thus the process DOE uses in issuing 202(c) emergency order can vary considerably based on the factual situation and whether other Federal or State laws are impacted. Flexibility is essential and the Department is leery of developing a formal process that may expedite a decision to issue an emergency order in a given instance, but prove an unnecessary hindrance in another.

However, the Department can work to ensure it continues to have fast and ready access to appropriate experienced staff, and as need be expert consultants, that are able to understand and converse in the various electricity generation, electricity transmission, electricity reliability, and environmental areas of expertise that would be needed in any future requests for use of DOE's emergency authority under sec. 202(c) of the Federal Power Act. This should include periodic meetings with relevant staff at other Federal agencies, such as EPA, so that agency staffs are familiar with each other and the legal authorities that would be used.

Question 4. Please also outline to the extent now possible the Department's plans for responding case-by-case to controversies of this type that may arise as a consequence of the EPA MATS Rule, the Cross-State Air Pollution Rule, the Clean Water Act 316 (b) Rule and any other similar rule that may be relevant to the Department's analysis and plans. In responding to the foregoing questions, please refer to your answer to Senator Murkowski during the hearing concerning the ability of the Department of Energy and/or EPA to respond case-by-case to conflicts between the maintenance of electric reliability and compliance with environmental rules applicable to generating units.

The cumulative effects of EPA regulations on electric reliability have been a much-discussed topic in recent months. FERC convened a Technical Conference, discussed above, to examine this issue. Commissioner Norris testified before the Committee that he "encouraged EPA to consider the cumulative impact of their regulations."

The DOE Office of Policy and International Affairs published a report on this issue, Resource Adequacy Implications of Forthcoming EPA Air Quality Regulations, on December 1, 2011. However, FERC and NERC were not consulted. Moreover, the report assessed resource adequacy only, not electric reliability, and only considered the impact of EPA's Utility MACT rule and Cross State Air Pollution Rule (CSAPR). The forthcoming Cooling Water Intake-316(b) Clean Water Act Rule and Green House Gas New Source Performance Standards were not assessed.

Your office was consulted for this report, but did not take the lead in producing it. In response to my question, "why wouldn't it be [OE] that would head up this type of a review?" you stated the following:

...Our office tends to look at, I will say, emergency-related events, energy events on the system, and we do the modeling and the analytics with respect to emergency events and that's been our mission and our focus, in looking at what is the technology to improve the energy infrastructure, what is the any potential impacts [sic] from weather or emergency events, and then how do we facilitate the recovery from those events. And that's been the focus and the mission of our organization.

Answer. Upon receiving a request for a Federal Power Act (FPA) section 202(c) order, the Department investigates to determine if the request does constitute an emergency under DOE's authority, including verifying any claims about electricity reliability made in the request. In cases where a generator's need to operate under a possible section 202(c) order may conflict with its ability to comply with an environmental regulation it is subject to, the Department engages with the EPA, as well as the relevant state environmental authorities, to identify the terms and conditions to operate under a 202(c) order that are necessary for the generator to address the emergency situation that has been verified earlier while still complying with environmental statutes. If the occasion should arise where it becomes necessary for the Department to issue a 202(c) order before EPA can establish an Administrative Compliance Order (ACO) with the generator, the Department could issue a subse-

quent order amending the original order to incorporate the operating and environmental mitigation conditions of EPA's ACO.

Question 5. Does OE only assess electric reliability in response to emergency events post hoc?

Answer. The Office of Electricity Delivery and Energy Reliability (OE) assesses electric reliability on an as-needed basis with several of its initiatives in accordance with its mission. Reliability analyses are an important part of OE's work to achieve a reliable and secure electric grid through planning, preparedness and analysis.

For nearly a decade, OE has been heavily engaged with the electricity sector in efforts to ensure there is a more reliable and secured electric grid as part of DOE's designation as the Sector-Specific Agency (SSA) for the energy sector. The SSAs were created under Homeland Security Presidential Directive 7 (HSPD-7) and were tasked to enhance the protection and resilience of the Nation's critical infrastructure, as well as with strengthening national preparedness and ensuring timely response and rapid recovery of critical infrastructure in the event of an attack, natural disaster, or other emergency.

In its SSA role, OE engages with the electricity sector on numerous issues, including the preparedness of the sector to address reliability threats from geomagnetic disturbances. Additionally, OE designs and facilitates regional energy assurance exercises to help state and local participants evaluate their assurance plans. Participants at these exercises included representatives from state energy offices, public utility commissions, governor's offices, and the electric industry. Working through these and similar activities, OE can assess reliability of the grid and its related restoration capability prior to actual emergencies.

In addition to working with states and other stakeholders on energy assurance and preparedness initiatives, OE also provides technical assistance to states, regions and other federal agencies. This technical assistance includes request for reliability assessment resources and general impact information due to new technologies, regulatory changes and resource planning. Through this assistance, OE helps facilitate the reliability assessments by states and regions and can then leverage this information to address any potential reliability emergencies identified at a regional or local level.

In its analytical role, OE also investigates the impact of new technologies and the ability of the grid to adapt to such technologies, e.g., variable generation, cycling of conventional generation. These analyses provide insights into potential reliability issues that may arise as new technologies are integrated into the electric system, allowing OE to further investigate mitigating measures to avoid such reliability issues, e.g., frequency response and other operational controls.

Moreover, through its Presidential Permit and Export Authorization Programs, OE considers the impacts on electric reliability of requested permits for the construction, connection, operation and maintenance of facilities for the transmission of electric energy at international boundaries or the export of electricity to a foreign country, respectively. Through these programs, OE assesses grid reliability to ensure that there is no negative impact on the sufficiency of electricity supply or an impediment to electric sector planning before issuing export authorizations and Presidential permits to avoid emergencies that might arise without such a preventative assessment.

Under the Energy Policy Act of 2005, DOE is required to generate a triennial congestion study which evaluates the grid system and identifies geographic areas where transmission congestion is inducing a variety of possible adverse impacts, which may include reliability problems. Development of the congestion studies has been assigned to OE. OE examines many kinds of transmission-related studies and data sets to identify geographic areas experiencing transmission congestion. The findings of DOE's congestion studies, and public comments on such studies, may lead to decisions by the Secretary to designate certain geographic areas as National Interest Electric Transmission Corridors. OE also currently facilitates broader interconnection-wide transmission planning to address not only potential congestion issues, but also generation, transmission, and resource needs to avoid future reliability problems.

Yet another example is the implementation of the Department's Federal Power Authority section 202(c) emergency authority. Should a situation arise that may warrant a DOE emergency order under that authority, OE may need to conduct a reliability assessment. If so, OE works closely with the regional reliability coordinators that are part of the North American Electric Reliability Corporation (NERC), independent system operators (ISOs) and regional transmission operators (RTOs), and local electric utilities as need be. Under the Federal Energy Regulatory Commission's (FERC's) oversight, NERC has the responsibility for monitoring and assessing bulk power electric grid reliability and enforcing reliability standards. OE

leverages the work and expertise of these organizations, as only the nation's grid operators and planners will have the detailed data needed to assess electric grid reliability.

Question 6. Can OE effectively perform its mission without prospectively assessing the reliability of the electric grids?

Answer. Assessing reliability requires access to large amounts of specific data concerning a local or regional electric grid and its operation. NERC conducts its reliability assessments through extensive use of data taken on a ground-up basis by its utility industry members and then rolled up through its regional reliability coordinators. Much of the data is only known by the grid and generation operators themselves, and can involve confidential business information. Not being part of the utility industry with ready access to the data that so often can be customized to a local situation, state and Federal government agencies can only go so far in conducting their own comprehensive reliability assessments and must therefore rely on partnerships with NERC, the reliability regions, and grid operators such as Regional Transmission Organizations (RTOs) and Independent System Operators (ISOs). That is why OE works closely with the appropriate reliability authorities to assess reliability on an as-needed basis.

That said, as the energy Sector-Specific Agency (SSA), OE engages in preparedness activities with the electric sector as well as implement its Presidential Permit and Export Authorization Programs. Both functions involve certain types of reliability assessments. Additionally, should a situation arise that may warrant use of its Federal Power Authority section 202(c) emergency authority, OE would conduct a reliability assessment as part of its consideration on whether to take emergency action. OE also developed an in-house Geographic Information System (GIS) software platform that allows OE to monitor the Nation's electric infrastructure system in near-real time as part of its emergency response responsibilities for the energy sector.

Question 7. In light of the public call for assessment of cumulative impacts of EPA rules, would you recommend to the Secretary that your office conduct a study on the cumulative impact of these four regulations—Utility MACT, Cross State Air Pollution Rule (CSAPR), Cooling Water Intake 316(b) Clean Water Act Rule, and Green House Gas New Source Performance Standards—on electric reliability?

Answer. Only two of the regulations have been finalized, and the proposed status of the remaining rules makes assessing their impacts challenging and the results only speculative at this time. When sufficient details are known regarding the final version of the regulations, a cumulative assessment of the corresponding potential impacts may provide valuable insights regarding the range of reliability impacts that may result. Many other organizations, i.e., RTOs/ISOs, policy research groups, and other government agencies, are already conducting similar analyses. The Department is leveraging the results of these studies to avoid duplicate efforts. Should such an occasion arise where it becomes appropriate and necessary for the Department to conduct its own cumulative assessment, OE would make a recommendation to the Secretary accordingly.

RESPONSES OF PATRICIA HOFFMAN TO QUESTIONS FROM SENATOR BARRASSO

Question 1. On December 8, 2011, I asked Dr. Majumdar at his confirmation hearing about the impact of the Environmental Protection Agency's regulations on the reliability of the electric grid. In response, Dr. Majumdar committed to me "to put together a team ...to help the utilities, and all the PUCs, and the stakeholders to make sure that the grid remains reliable." Please update me on the progress of this initiative.

Answer. Since Dr. Majumdar's testimony on December 8, 2011, an internal DOE-wide team meets periodically to report on and coordinate their individual efforts in monitoring grid reliability relating to the EPA rules. Part of this effort includes technical assistance to help utilities, state public utility commissions and other stakeholders in their compliance efforts. At the Winter 2012 National Association of Regulatory Utility Commissioners (NARUC) Meeting and the 2012 National Electricity Forum, both in February, as well as on its website, the Department announced the availability of such technical assistance. Thus far, technical assistance has been provided to a few states, upon their request.

In addition to technical assistance, the Department's efforts include continued coordination with EPA and the Federal Energy Regulatory Commission (FERC) as well as discussions with industry groups, planners and reliability organizations. For example, in February DOE, FERC, and EPA, with the nation's regional transmission operators/independent system operators (RTOs/ISOs) met to hear both what their plans are to monitor and address any possible reliability impacts from genera-

tors in their region as they implement the EPA final Mercury and Air Toxics (MATS) rule issued in December 2011, as well as any early insight the RTOs/ISOs have on potential reliability problems in their respective footprints. We are also, through publicly available information, monitoring the announcement of power plant retirements and the status of power plants expecting to retrofit.

Question 2. On March 20, 2012, Regina McCarthy, Assistant Administrator for Air and Radiation at the Environmental Protection Agency (EPA), testified before the Senate Subcommittee on Clean Air and Nuclear Safety. Ms. McCarthy stated that EPA had not conducted an assessment of the cumulative impact of all of EPA's regulations, including proposed regulations that have not yet been made final. How can the Department of Energy assess the impact of EPA's regulations on the reliability of the electric grid if EPA has not conducted an assessment of the cumulative impact of its regulations?

Answer. Assessing the electric grid reliability impacts of EPA's recent suite of regulations—MATS, Cross State Air Pollution Rule (CSAPR), Cooling Water Intake 316(b) Clean Water Act Rule, and Green House Gas New Source Performance Standard—is challenging given the current status of the regulations. Thus far, only two of the regulations have been finalized. Any assessments of the remaining rules, which have only been proposed, would yield results that are speculative at this time. Many other organizations, i.e., RTOs/ISOs, policy research groups, and government agencies, are already conducting similar analyses. The Department is leveraging the results of these studies to avoid duplicate efforts. Should such an occasion arise where it becomes appropriate and necessary for the Department to conduct its own cumulative assessment prior to the remaining rules becoming final, the Department's results would offer potential boundaries for the range of reliability impacts, rather than definitive impacts that would result from the suite of regulations.

Question 3. As Assistant Secretary for Electricity Delivery and Energy Reliability, do you believe EPA should conduct an assessment of the cumulative impact of all of its power sector regulations, including proposed regulations that have not yet been made final? If not, why not?

Answer. As Assistant Secretary for the Department of Energy's Office of Electricity Delivery & Energy Reliability, I cannot speak to how EPA should assess its power sector regulations. However, it is the Department's understanding that, as EPA proposes and finalizes additional regulations, its administrative regulations require that each proposed/finalized rule be considered in concert with all other effective regulations.

Question 4. As Assistant Secretary for Electricity Delivery and Energy Reliability, do you believe EPA should issue any additional final rules affecting the power sector, including the pending coal ash regulations, before an assessment of the cumulative impact of EPA's regulations is completed? If so, why?

Answer. As Assistant Secretary for the Department of Energy's Office of Electricity Delivery & Energy Reliability, I cannot speak to how EPA should release its power sector regulations, in accordance with its statutory directives.

RESPONSES OF THOMAS B. GETZ TO QUESTIONS FROM SENATOR MURKOWSKI

Question 1. Although FERC's report on the New England outages has yet to be finalized, Mr. Bay from the Commission has testified that approximately 95 percent of the customer outages were caused by damage to the distribution facilities.

Do you agree with that assessment? If so, what is it that you're asking the federal government to do? What steps has the State of New Hampshire taken in response to the October snowstorm?

Answer. Based on my personal experience during the October 2011 Nor'Easter, Mr. Bay's assessment that around 95 percent of customer outages were caused by damage to distribution facilities appears reasonable insofar as it relates to New Hampshire. I am not in a position to express an opinion on his assessment as it may apply to other states in New England.

In my testimony to the Committee, I pointed out that the interconnected electric grid is a complex structure that crosses state boundaries and is subject to shared jurisdiction involving state and federal agencies. I also expressed my view that the Federal Energy Regulatory Commission and the North American Electric Reliability Corporation, especially with respect to extreme weather events that impact the electric transmission system, should work cooperatively with the states, look closely at the performance of utilities to determine whether they are acting prudently, and hold utilities accountable to reasonable standards. I understand from Mr. Bay's testimony that FERC and NERC have conducted a joint inquiry into the October 2011 Nor'Easter and are finalizing their report.

The State of New Hampshire is conducting an After Action Review of the Nor'Easter and is expected to issue a report in June.

Question 2. NERC is incorporating risk-based assessments into all its reliability standards in a system-wide transition.

What are utilities doing to apply risk-based assessments at the distribution level?

Answer. In New Hampshire, for instance, the electric utilities apply risk-based assessments at the distribution level as part of vegetation management. Specifically, they identify for removal so-called "hazard trees" that are adjacent to distribution lines but outside of trim zones or rights-of-way and which, due to size, age, or disease, pose a risk to a line.

Question 3. Do utilities have a tendency to undervalue risk outside their own service territory?

Answer. I do not have sufficient information to offer an opinion on this question as a general proposition.

Question 4. Should NARUC play a role in fostering cooperative risk assessment?

Answer. NERC issued a white paper on April 20, 2012, entitled Risk-Based Reliability Compliance Monitoring. Among other things, the paper points out that as NERC has evolved "greater emphasis has been placed on incorporating risk-based concepts in all endeavors to more efficiently utilize resources and focus on the significant risks of the electrical sector."

The white paper also quotes from NERC's Strategic Plan, approved in February 2012, its vision:

"To be the trusted leadership that ensures and continuously improves the reliability of the North American bulk power system (BPS) by implementing relevant standards; promoting effective collaboration, cooperation, and communication around important risks to reliability; and utilizing expertise from the industry to produce outcomes that improve reliability."

NERC recognizes the critical importance of collaboration, cooperation and communication, as well as the value of utilizing outside expertise. Correspondingly, NARUC encourages its members to "actively participate in the development of and casting of informed votes on pertinent reliability standards applicable to the bulk electric system." See, Resolution on Increased Public Utility Commissions Participation in NERC' Standard Development Process, Adopted July 27, 2005. As greater emphasis is placed on incorporating risk-based concepts, NERC and NARUC should work together to ensure that such concepts are applied appropriately.

RESPONSES OF NORMAN C. BAY TO QUESTIONS FROM SENATOR MURKOWSKI

Question 1. You noted that a full 95 percent of the problems appear to have been at the local distribution level.

By what process does FERC decide to open an inquiry of this nature? How do you work with NERC in this process? Would the Commission have opened an inquiry absent Congressional interest?

Answer. Since February 2011, FERC and NERC staff have conducted three "inquiries," into (1) the February 2011 "Cold Snap" gas and electric outages in Texas, New Mexico and other areas of the Southwest; (2) the September 2011 blackout of San Diego and other areas in southern California, Arizona and Baja California, Mexico; and (3) the Northeast Storm Damage electric outages of October 2011. These inquiries are factintensive examinations of complicated events. They require large commitments of time and resources from staff of the Commission, NERC and affected Regional Entities, as well as from the registered entities and other companies and persons from which inquiry staff has gotten information. FERC, NERC and the Regional Entities cannot conduct an inquiry into each event, so we try to focus and use our resources wisely. While no two events are the same, the Commission and its staff consider the totality of circumstances, including the following major factors in deciding whether to conduct inquiries:

- a. The scope, seriousness, and magnitude of the event, including the number of people affected, size of the impacted area or number of States, duration of the outage, economic loss and megawatts shed;
- b. Whether timely dissemination of lessons learned from the event could improve reliability of the bulk-power system and/or the interstate natural gas pipeline network, and help prevent future, similar events;
- c. Whether the event affects entities subject to the Commission's jurisdiction or raises jurisdictional questions for the Commission;

- d. Whether the event implicates emerging issues that affect the Commission, such as the natural gas/electricity interoperability issues raised by the February 2011 Cold Snap event;
- e. The level of interest of the public and elected officials in the event;
- f. Staff resources and skills needed to conduct the inquiry; and
- g. Whether federal expertise or leadership would be helpful.

The Commission and its staff have opened consultation with NERC and applicable Regional Entity management and staff on whether an inquiry was appropriate on the day of these events or very shortly thereafter. These consultations continue on an ongoing basis from the establishment of the scope of an inquiry through its conclusion. Staff from the Commission and NERC have worked together cooperatively and fruitfully in each of these inquiries, along with staff from the Regional Entities, as appropriate.

Question 2. Given that you are still analyzing the role of FERC’s Vegetation Management Reliability Standard in this outage, please comment on vegetation management Reliability Standards, and that petition is currently pending before FERC.

Answer. As noted above, proposed Reliability Standard FAC-003-2 is pending before the Commission. As part of the Commission’s rulemaking process, the Commission expects to issue a Notice of Proposed Rulemaking with a comment period to follow. After the comment period, the Commission will issue a final rule.

Question 2a. What are the critical differences between the new and old standards?

Answer. NERC states in its petition requesting approval of proposed Reliability Standard FAC-003-2 that it has seven requirements compared with the four requirements in the currently-effective Reliability Standard FAC-003-1. According to NERC, the proposed Reliability Standard “improves reliability by maintaining a reliable electric transmission system by using a defense-in-depth strategy to manage vegetation located on transmission rights of way (“ROW”) and by minimizing encroachments from vegetation located adjacent to the ROW, thus preventing the risk of those vegetation-related outages that could lead to Cascading.” (NERC Petition at 1.) The NERC petition contains a table identifying requirement-by-requirement differences between the current and proposed Reliability Standards, which is reproduced below.¹

Requirement in Existing FAC-003-1 Standard	Improvements in Proposed FAC-003-2 Standard
Requires a document that includes vegetation management objectives, approved procedures, and work specifications. (R1)	Requires documented vegetation management maintenance strategies, procedures, processes, or specifications that will prevent encroachment into the Minimum Vegetation Clearance Distance (MVCD) (R3)
Requires a document schedule for ROW vegetation inspections (R1.1)	Requires vegetation inspection of 100% of applicable transmission lines at least once per calendar year. (R6)
Requires documentation of a “Clearance 1” value based on TO assessment of situation and risk (R1.2 and R1.2.1)	Requires vegetation be managed such that no encroachments into the MVCD (as established by the Gallet Equation) occur, regardless of whether or not they result in a sustained outage. (R3, parts 3.1 and 3.2)

¹In the NERC table, the abbreviation “TO” refers to Transmission Owners, “ROW” refers to rights of way, and the parentheticals containing the letter “R” refer to requirement numbers in the current and proposed Reliability Standards, respectively.

Requirement in Existing FAC-003-1 Standard	Improvements in Proposed FAC-003-2 Standard
Requires documentation of a “Clearance 2” value based on IEEE standard. (R1.2.2.1, and R1.2.2.2)	Requires vegetation be managed such that no encroachments into the MVCD (as established by the Gallet Equation) occur, regardless of whether or not they result in a sustained outage. (R1 and R2)
Requires documentation of mitigation measures to address locations on the on the ROW where the TO is restricted from attaining specified clearances. (R1.4)	Requires corrective action to be taken in cases where a TO is constrained from performing vegetation work. (R5)
Requires documentation of a process for communicating imminent threats where vegetation conditions could lead to a transmission line outage. (R1.5)	Requires TOs, without any intentional time delay, to notify the control center holding switching authority for the associated applicable line when the TO has confirmed the existence of a vegetation condition that is likely to cause a Fault at any moment. (R4)
Requires the creation and implementation of an annual vegetation management plan, as well as a process for documenting and tracking the execution of the plan. (R2)	Requires the TOs annual vegetation management plan be executed such that no vegetation encroachments occur within the MVCD. (R7)

(NERC Petition at 4.)

The NERC petition also proposes to add definitions of “Right-of-Way (ROW),” “Vegetation Inspection,” and “Minimum Vegetation Clearance Distance (MVCD)” to the NERC Glossary of Terms. The proposed Reliability Standard eliminates the currently effective requirement concerning “appropriate” qualifications for personnel involved with the design and implementation of Transmission Vegetation Management Plans (TVMP), which is not reflected in the NERC table above.

Question 3. Had they been implemented last year, would CL&P been subject to the new standards? How would the new standards have affected vegetation management prior to this outage had they been applied?

Answer. Assuming proposed Reliability Standard FAC-003-2 was implemented in 2011, FAC-003-2 would apply to CL&P because it is registered with NERC as a “Transmission Owner” and proposed Reliability Standard FAC-003-2 applies to Transmission Owners.

As discussed in response to the question above, proposed Reliability Standard FAC-003-2 differs in a number of ways from the currently-effective Reliability Standard FAC-003-1. The Commission is still analyzing these differences and cannot determine at this time the effects the proposed standard might have had if it had been applicable prior to the outage. It is unlikely, however, that it would have made a significant difference since most of the lines that were rendered inoperable by the storm were distribution facilities that were not subject to the current standard, and would not have been subject to the proposed standard as well.

Question 4. Has your Vegetation Management Reliability Standard been litigated? Do you see a nexus between litigation and increased systemic risk?

Answer. No, we are not aware of any litigation involving Reliability Standard FAC-003-1, the currently-effective Transmission Vegetation Management Program Reliability Standard. The Commission approved the currently-effective standard in 2007 in the Commission’s Order No. 693. Approval of Reliability Standard FAC-003-1 was not challenged in federal court. NERC has submitted to the Commission a number of Notices of Penalty involving alleged violations of Reliability Standard FAC-003-1. However, these Notices of Penalty involved negotiated settlements and no entity has petitioned for Commission review of a Notice pertaining to FAC-003-1. While the Commission has instituted a review of a single Notice involving a viola-

tion of FAC-0031, the review relates to the penalty assessed for the violations covered by the Notice, not whether a violation of FAC-003-1 occurred.

As Reliability Standard FAC-003-1 has not been litigated, we cannot say whether there is a nexus between litigation and increased systemic risk.

RESPONSES OF JOHN BILDA TO QUESTIONS FROM SENATOR MURKOWSKI

Question 1. Is Norwich Public Utilities subject to NERC's Vegetation management standards? If not, is NPU subject to Connecticut state standards? How do they contrast?

Answer. Norwich Public Utilities is registered with NERC (ID #NCR07038) as a Distribution Provider and Load Serving Entity. There are no NERC vegetation standards at the distribution level that apply to Distribution Providers and Load Serving Entities. The State of Connecticut Public Utility Regulating Authority (PURA) does not have vegetation management standards for electric distribution systems.

Question 2. Why did some utilities handle the storm better and restore power more quickly than others?

Answer. I can only comment on what worked well for Norwich Public Utilities in terms of storm response and system damage restoration. Norwich Public Utilities credits its performance to a flexible, cross trained, highly valued workforce; very effective communication and planning with the communities first responders, public works, and City Government; and technology leveraging with geographic information systems, outage management systems, and NPU owned fiber optic communication system.