



OVERVIEW OF RESPONSE TO HURRICANE SANDY-NOR'EASTER AND RECOMMENDATIONS FOR IMPROVEMENT

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Office of Electricity Delivery and Energy Reliability

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I. Introduction

Following the severe and widespread impact of Hurricane Sandy, the U.S. Department of Energy (DOE) reviewed the preparation, response, recovery, and restoration activities performed within its organization and by the Energy Sector. Understanding the wide range of challenges encountered by owners and operators of the energy infrastructure, States and localities, utility customers, and the Federal government will establish the basis for continuous improvement in preparedness and response activities.

Hurricane Sandy was the second-largest Atlantic tropical cyclone on record. Making landfall on October 29, 2012, Sandy's impact stretched across 21 States¹—from North Carolina to Maine and as far west as Illinois – bringing extreme winds, heavy rains, and flooding. At its peak, hurricane-force winds extended 175 miles from the center of the storm and tropical storm-force winds extended 500 miles. Sandy caused significant damage to the energy infrastructure. During the recovery process, a Nor'easter hit the Mid-Atlantic and northeast causing additional electrical outages and damage to the region's energy infrastructure and prolonging recovery. For Sandy and the Nor'easter combined, the peak in each of the 21 States impacted totaled 8.6 million customers without power. To date, the estimated cost of property damage due to Sandy is in the tens of billions of dollars.

This document provides an initial review of DOE's Sandy-Nor'easter preparation and response activities, highlights some of the observations made during the response, and recommends specific activities to help DOE move forward with its government colleagues and industry partners to increase the resilience of the nation's energy infrastructure.

¹ There were 21 States who had 1,000 or more customers who lost power due to Sandy. The weather impacts from Sandy were felt across 24 States.

After Action Process

In December 2012, DOE held a series of “Hotwash” meetings to discuss and review challenges, lessons learned, and examples of what worked well in response to Sandy. The focus of these meetings was to identify how to improve preparation and response for future events. The first meeting was the ESF-12 Internal Hotwash, which was organized by the Office of Electricity Delivery and Energy Reliability (OE) Infrastructure Security and Energy Restoration (ISER) Division, which has the DOE lead for Emergency Support Function 12 – Energy (ESF-12). Its purpose was to identify opportunities for improving situational awareness, reporting, and the operations of ESF-12 responders at headquarters and in the field.

The second internal DOE Hotwash was held with the DOE elements contributing to the response: Power Marketing Administrations, the Energy Information Administration, Office of Fossil Energy, Chief Information Officer, National Nuclear Security Administration, Chief Financial Officer, Office of Policy and International Affairs, and others. A series of meetings were held with State and local government officials in New York and New Jersey to elicit their views regarding response and restoration of energy services. Additional Hotwash meetings were held with energy infrastructure owners, operators and their representative associations—one with the electricity sector and another with the oil and natural gas sector.

These discussions identified preparation and response measures that worked well and initial thoughts on areas where improvements could be made. Specific recommendations have been developed to lead to better preparedness, response and restoration. The outcomes from ongoing After-Action activities will provide DOE and the Energy Sector a framework to enhance the resilience of the Nation’s energy infrastructure.

II. Background of Event

On the night of October 29, 2012, Sandy made landfall near Atlantic City, NJ, as a post-tropical cyclone. Over the next three days, the impacts of Sandy could be felt from North Carolina to Maine, and as far west as Illinois. With an unprecedented storm surge in the affected areas, there was especially severe damage to the energy infrastructure. Peak outages to electric power customers occurred on October 30 and 31 as the storm proceeded inland from the coast, with peak outages in all States totaling over 8.5 million, as reported in the DOE Situation Reports. Much of the damage was concentrated in New York and New Jersey, with some customer outages and fuel disruptions lasting weeks.

Initial Sandy Hotwashes

December 4- ESF-12 Internal Hotwash
DOE Staff, Responders, and supporting staff

December 10- DOE Internal Hotwash -
*Representatives from DOE Departments:
CIO, EIA, FE, GC, NNSA, OE, PMAs and PI*

December 11-12 – State and Local meetings
*- DOE meetings with individual State and
Local officials in NY and NJ*

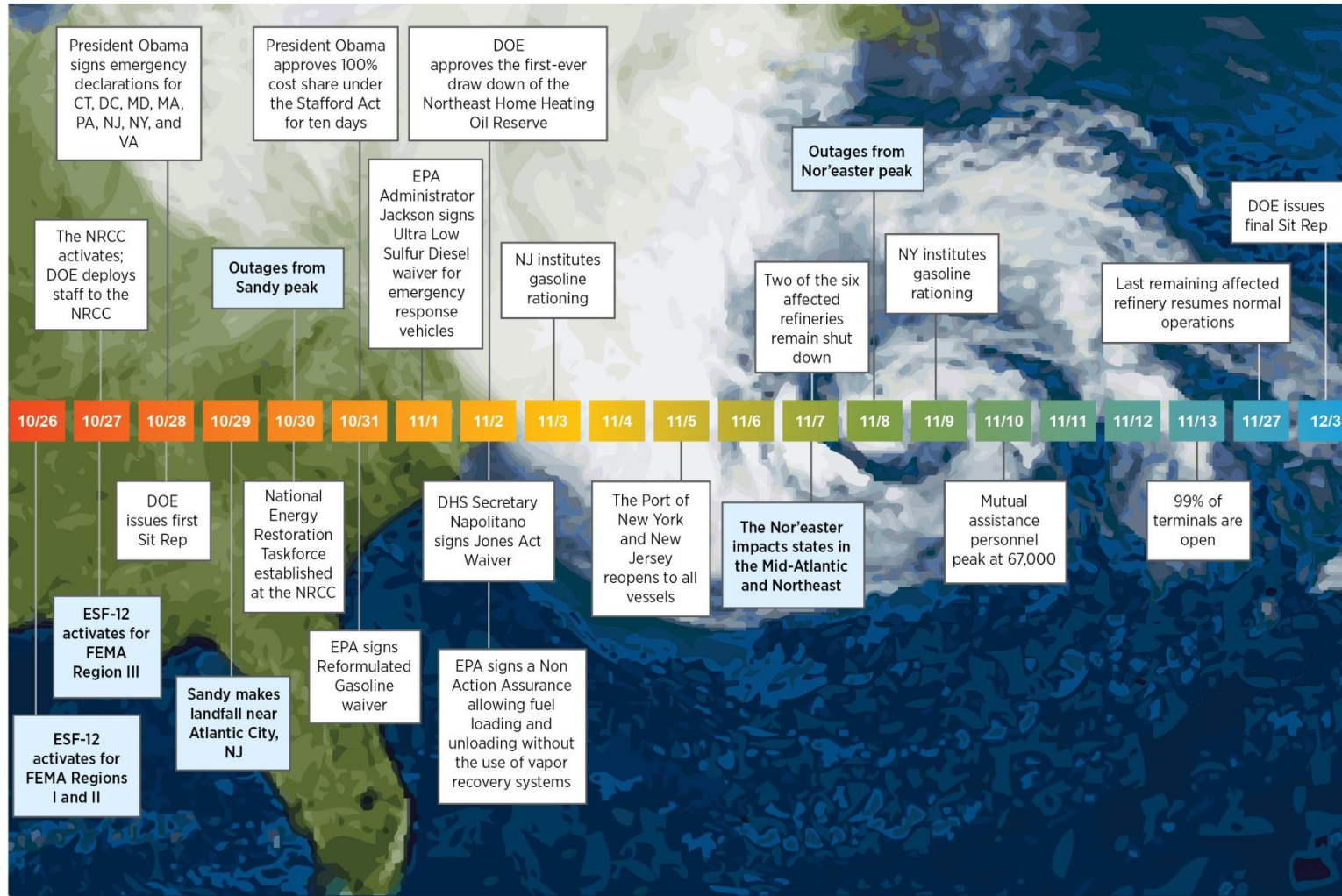
December 13- Electricity Hotwash -
*DOE Deputy Secretary, OE Senior Staff, and
Electricity Owners, Operators and
Associations*

December 14- Oil & Natural Gas Hotwash -
*DOE Deputy Secretary, OE Senior Staff, and
Oil & Natural Gas Owners, Operators and
Associations*

January 30 – Multi-State Fleet Response
Initiative Working Group – *DOE, DHS, FEMA,
State officials in PA, NJ, NY, electricity and
fuel owners and operators*



HURRICANE SANDY Response Timeline



Beginning November 7, 2012, a Nor'easter impacted the Mid-Atlantic and Northeast with strong winds, rain and snow, and coastal flooding. The second storm caused more than 150,000 additional customer outages and prolonged recovery.

According to the Edison Electric Institute, 67,000 mutual assistance personnel from 80 electric utilities, primarily private sector but including some government, from across the U.S. assisted with electric power restoration. Within two weeks of Sandy's landfall, workers had restored power to 99 percent of customers who could receive power.

The Administration assisted in the preparations, response, and recovery from the storm by coordinating the Federal response effort. This effort included the following:

- On October 31, the President sent a "Senior-Assessment Team," consisting of the Deputy FEMA Administrator, a DOE Deputy Assistant Secretary, a flag officer from NORTHCOM, and White House personnel, into the field. The team was tasked to directly address problems on the ground as they surfaced.
- President Obama approved a 10-day Federal funding waiver effective October 31, bypassing the need for State cost-share under the Stafford Act, in order to accelerate the government components of the response.
- Under ESF-12, DOE deployed 35 responders to Regional Response Coordinating Centers (RRCCs) in three FEMA regions (I, II, and III), the New York and New Jersey Emergency Operations Centers (EOCs), the National Response Coordination Center (NRCC) at FEMA's headquarters, and the Energy Response Center (ERC) at DOE's headquarters. These responders served as the energy advisors at their respective sites, handling issues and policy decisions relating to response and restoration efforts.
- OE began issuing its publically available DOE Situation Reports on October 28. Between October 28 and December 3, 2012, thirty-three DOE Situation Reports were issued, providing situational assessment of the impacts to and restoration activities of the electricity, oil, and natural gas sectors following Sandy and the Nor'easter.
- Three DOE Power Marketing Administrations (PMAs)—Bonneville Power Administration (BPA), Western Area Power Administration (WAPA), and Southwestern Power Administration (SWPA)—brought in 235 staff and roughly 200 pieces of equipment to help restore downed lines and repower substations. This was the first time WAPA or SWPA had engaged in mutual aid with investor-owned utilities as part of DOE's ESF-12 response. The U.S. Department of Defense (DOD) supported this effort by airlifting equipment from the PMA facilities in Washington and California.
- Starting the day before the storm struck the East Coast, senior DOE leadership began to participate in daily coordination calls with the electric sector CEOs and the Edison Electric Institute. DOE worked with utilities to assess their needs and ensured prioritization of repairs and power restoration to critical infrastructure. These efforts focused primarily on restoring power to affected terminals and refineries.



HURRICANE SANDY: Energy Response Actions

STORM IMPACTS

- 8.6 million customer outages— largest number ever reported from a single storm
- 21 states impacted
- Damage stretches from North Carolina to Maine, from New York to Illinois

DOE AND ESF-12 RESPONSE

- Daily conference calls between utility CEOs and Secretary Chu
- Energy Restoration Task Force created at the request of the President, addressing both power and fuel issues
- 33 ESF-12 Situation Reports published
- 34 infrastructure maps created
- 35 responders deployed to:
 - FEMA National Response Coordinating Center
 - DOE Energy Response Center
 - FEMA Region I RRCC (Boston, MA)
 - FEMA Region II RRCC (Colts Neck, NJ)
 - FEMA Region III RRCC (Philadelphia, PA)
 - NY State Emergency Operations Center (Albany, NY)
 - NJ State Emergency Operations Center

MUTUAL ASSISTANCE

- 67,000 mutual assistance personnel and worked to restore power
- DOE brought in 235 people and around 200 pieces of equipment from the Power Marketing Administrations, including Bonneville Power Administration (BPA), Western Area Power Administration (WAPA), and Southwestern Power Administration (SWAPA). They helped restore downed lines and power substations.
 - *This was the first time WAPA or SWAPA engaged in mutual aid with an investor-owned utility.*

FUEL WAIVERS AND RELEASES

- Jones Act Waiver
- Fuel Flexibility Waivers
 - Reformulated Gasoline (RFG) waiver.
 - Ultra Low Sulfur Diesel (ULSD) waiver for emergency response vehicles and equipment in NY, NJ, and PA.
 - Non Action Assurance allowing fuel loading and unloading without the use of vapor recovery systems.
- Released Northeast Home Heating Oil Reserve for the first time

- The U.S. Department of Transportation (DOT), other Federal agencies, and elements of the private sector worked with State and local authorities to ensure utility crews were able to reach the impacted areas. This included plowing snow and clearing fallen trees or other debris from the roads ahead of utility teams. For the first time, utility trucks were classified as emergency responders, allowing them to go to the head of fuel lines.
- DOE staffed the Energy Restoration Task Force at the NRCC. This group concentrated on power restoration and fuel availability. The Task Force focused on eliminating roadblocks and identifying choke points in power and fuel distribution systems. This was the first task force of its kind and its successes and failures will be evaluated for potential future implementation and standardization.
- On November 2, President Obama declared that Hurricane Sandy created a severe energy supply interruption and directed the Energy Department to loan the Department of Defense ultra-low sulfur diesel from the Northeast Home Heating Oil Reserve.

III. Recognized Practices

Well before Sandy made landfall, its scale and intensity made it clear that an unprecedented effort would be required to respond to its impacts. Some of these activities undertaken during the response are worth noting for consideration as possible “best practices” for future large scale disturbances to the energy infrastructure. Several are noted below:

Dedicated senior leadership involvement. The scale of Sandy’s impacts required direct CEO involvement in hurricane response, as well as direct and regular communication between CEOs and Federal leadership. For example, the Secretary of Energy participated in daily conference calls with CEOs of major utility companies to assess electricity restoration and conditions. These communications aided both the restoration process and provided situational awareness to the government, enabling increased coordination between the public and private sectors. Additionally, the high-level interactions led to the placement of a private sector staff at the FEMA NRCC. This facilitated greater access to services and resources to support restoration. Senior leadership in the field also provided senior management at DOE headquarters with high-level situational awareness.

Expanded mutual aid assistance. Prior to the storm but ramping up once weather conditions stabilized, the electric and natural gas utilities mobilized the largest-ever dispatch of mutual aid workers across the country (totaling approximately 70,000) This total included DOE PMA crews from BPA, WAPA and SWPA. The effort to move these additional resources throughout the country required coordination at all levels of government. This included the expedited movement of personnel and equipment by DOD, waivers at the State and Federal levels to facilitate movement across State lines, and the commitment by companies to offer their own assets to assist the utilities and customers in affected areas.

Expedited waivers. The President’s guidance that he would have “zero tolerance for red tape” had an immediate beneficial effect, as Federal and State governments quickly processed a variety of waivers to remove barriers to response and restoration. Both public and private sector partners utilized the waivers to aid the movement of crews across the country with limited interruptions

and to provide flexibility in fuel systems. These waivers allowed workers to cross State lines, bring heavy equipment into the disaster areas, and quickly restore (at least) partial service—whether oil, gasoline, natural gas, or electricity—while addressing more long term restoration requirements. Agencies, including DOE, DOT, and the Environmental Protection Agency (EPA), among others, worked directly with owners and operators, industry trade organizations, and other Federal agencies to perform the due diligence needed to quickly approve waivers to facilitate restoration.

IV. Areas for Improvement

Though individuals throughout the public and private sectors dedicated tireless efforts to respond to Sandy, the tremendous scale of the storm and its destruction stripped bare a number of areas where our institutional mechanisms fell far short of what was needed to respond, mitigate, and restore the damaged energy infrastructure. It is essential that we take full advantage of these lessons and take the steps needed to ensure more effective responses to future events. Some of the major areas where improvement is needed are in availability of information of energy supplies and communication of restoration schedules. Access to impacted areas for restoration crews was a difficulty, as well as access to fuel and equipment needed in the restoration were both significant challenges that need to be addressed. While mutual assistance in the electricity sector was critical to the restoration of the infrastructure, improving efficiencies in scheduling and resource tracking is needed.

Information and Communications

Inadequate situational awareness of fuel supplies. Efforts to assist were impeded by a lack of information and understanding of where fuel was located and where it was needed. Data related to retail gas station levels is not available in real time. This lack of information significantly impeded governments' abilities to provide fuel or prioritize restoration to those areas that could have received it. A lack of data related to the ability of terminals to deliver fuel and their potential restoration estimates also created challenges for distribution of resources.

Better situational awareness, both pre- and post- event, would have allowed DOE to respond more quickly. Understanding the types of products and storage volumes in the petroleum fuels systems, how the storm surge could impact the energy infrastructure, and what resources were available in the affected regions, all would have contributed to a more effective response. Limited personnel resources, in addition to limited data resources and tools, negatively affected DOE's capacity to respond quickly. More resources in the field, integrated with energy sector partners as well as State and local responders, would have provided channels of communication back to DOE headquarters staff and leadership. These channels would allow faster communication of challenges, needs, and resources specific to the needs of critical energy sector partners. The Department is examining how much more could have been done, with greater dispatch, had additional resources been available to the Department.

Better communication of restoration timeframes needed. Examples of inaccurate and/or inadequate communication were exhibited within and between government, industry, and the

public. Difficulty in communicating the availability of resources, restoration times and priorities, and community needs were recognized as key problems in all Hotwash discussions. In particular, the ability and willingness of utilities to share restoration information with stakeholders was uneven across companies. An example is a utility providing an estimated restoration timeline for a particular substation and the feeds from that substation but not communicating the area serviced by those feeds. Without an accurate sense of when power would be restored, communities were unable to plan effectively. Citizens were sometimes unable to decide when and if they could return to their homes; governments could not adequately identify needs and match them with resources. While it is clear that restoration is a challenging and complicated process, utilities need to do a better job of continually updating customers or, at least, explaining why they cannot produce the requested information.

Access and Resources

Crews and other first responders. The level of devastation in New Jersey and New York created many complications for both public and private sector responders. It was vital to assess damage while simultaneously ensuring protection of life and safety. One major impediment to both of these tasks was access to critical sites that needed to be restored. The storm conditions affected the ability of State, local and Federal governments to assist with staging, prepositioning, and other services which could have accelerated restoration once the storms had passed. A significant storm surge in some areas and high winds and rain in others inhibited the activities and movement of utility workers in the hardest hit States, particularly New Jersey and New York. Debris from by the storm was another major challenge. Although the National Guard was on-hand to assist with debris removal, safety hazards throughout impacted electric and natural gas infrastructure impeded progress, slowing the pace of restoration. The considerable challenge of removing debris, while also working to restore power to those able to receive it was especially difficult in areas that had experienced significant flooding. Communities are still working to remove debris, including downed trees, destroyed buildings, and displaced sand. The task of determining what can be done with the collected refuse remains an issue throughout the affected region. In New Jersey alone, 116,000 trees were downed as a result of the storms.

Fuel. Liquid fuels were essential for responders across all sectors. Wind and flooding caused damage to critical fuel facilities such as terminals, pipelines, storage facilities and truck racks, as well as to the electric power infrastructure that energizes those facilities. This led to significant shortages of fuels in the affected regions. Docks, control systems, vapor recovery units, and electric switching gear within facilities sustained serious damage. Replacement of parts and components and the complexity of the systems required time and technical expertise to safely restore services. Simultaneously, retail gasoline stations were without commercial power and/or fuel supplies in many instances, and those with power quickly ran out of fuel. The combined effects of damage to terminals, loss of electric power, and high demand for fuel led to shortages and long lines for fuel across the region. Gasoline rationing policies were eventually implemented, first in New Jersey and later in New York.

Electric Power. Due to the unprecedented damage to the electricity infrastructure, a massive restoration effort was required. While PMA crews have participated in mutual aid efforts in the past, the implementation of 100 percent Federal cost share during Sandy marked the first time

PMAAs provided assistance under the Stafford Act. Although the PMA response was successful, PMAAs were not considered in advance for the restoration effort and were not pre-positioned to respond. In addition, restoration efforts among the electric utilities and the Oil and Gas sector did not appear to be done in parallel but rather sequentially. This oversight extended restoration activities and complicated the prioritization of the response.

Equipment. In terms of long term restoration, access to equipment can be a major challenge for many of the operators attempting to repair or replace damaged and destroyed equipment. Much of the equipment used by electric and natural gas utilities, as well as oil and gas operators, is not quickly found, procured, and delivered. In some cases, infrastructure is outdated and replacement components are not readily available. Whether an issue of size, weight, technology, or cost, this equipment can take time to source, deliver, and install. As restoration proceeds, this challenge will continue to affect progress and the long-term reliability of systems. Additionally, the prolonged use of temporary patches can produce complications when waivers expire and regulatory enforcement resumes. Potentially, conditions may arise that require owners to operate at decreased capacity, which may affect primary and secondary services and processes.

Mutual Assistance Arrangements

Assignment of resources. Although the mutual assistance response in the electric sector was unprecedented in size and scope, there were problems that need to be considered before another event. Due to the size of Sandy and the uncertainty in where severe impacts would occur, utilities throughout the region retained crews in their own service territories as a necessary precaution. As the storm progressed northward, utilities had to assess, repair, and certify their own systems before releasing crews to areas where the storm continued to impact the electric infrastructure. Limited movement of crews within the region, as well as into the region due to weather conditions, limited fuel supplies, and local restrictions further delayed response. Additionally, the movement of crews and equipment within the region and within States was not adequately communicated and coordinated with State and local governments. In many cases States were not aware of the processes and protocols of the existing mutual aid framework which led to confusion at the local level as crews transited impacted areas.

Oil and gas sector lacks commensurate mutual assistance network. Whereas the electrical utilities have decades of experience in mutual assistance arrangements and rallying to one another's support in response to natural disasters, no such arrangements exist in the oil and gas sector. The problem is aggravated by the competitive nature of the oil and gas industry, anti-trust legislation, and uncertainty of if and how mutual assistance can be adapted to the oil and gas industry.

V. Recommended Actions

This section describes the actions that industry and State, local, and Federal governments need to implement to enhance preparedness, response, restoration and resilience to events impacting the Nation's critical energy infrastructure. These recommendations were developed through a series of Hotwash meetings with industry, Federal, and State and local governments.

Information and Communications

Educate stakeholders on the process for requesting and attaining necessary waivers. The government's efforts to efficiently process needed waivers were noted by both the public and private sectors, but there were instances when owners and operators were not aware of the process to request waivers or when waivers had already been granted. To avoid these potential impediments to restoration, agencies should take steps to ensure their processes are clear, well documented, and regularly communicated to stakeholders within the sector.

Share recommended practices with all energy sector stakeholders. The Federal government should collect and disseminate lessons learned generated from the After Action Hotwashes and discussions to improve long-term planning and response preparations. The Federal government can review stakeholder emergency response plans on an as requested basis to identify where improvements are needed. These improvements can include lessons learned from prior events.

Develop real-time monitoring of fuel availability and storage levels at all points of the pipeline from well to wheel. This information must be communicated in real time to customers and decision makers. The Federal government can work with the private sector to design technologies that measure and report accurate, real-time information. DOE should work with partners across the oil and natural gas sector to identify existing technologies to deliver this capability, and to identify if Federal investment is required for technology research, development and deployment.

Embed fuels industry representatives in operations centers. States can integrate fuel industry representatives in operations centers, and similarly the Federal government can integrate them in JFOs or RRCCs. This will provide a critical communications link for both government officials and the participating company. For example, industry representatives can help coordinate efforts with the available resources at the State, local, and Federal levels, such as with the National Guard or U.S. Army Corps of Engineers.

Identify interdependencies between the electricity and oil and gas sectors to educate stakeholders and decision makers. The Federal government should establish communication between critical energy infrastructure owners and operators to create a better understanding of interdependencies. This will include identifying energy requirements, communicating restoration processes, and identifying restoration priorities. Matching needs with resources and expertise will allow fuel industry owners and operators to plan restoration efforts in line with power restoration, thereby improving prioritization of critical facilities. Exercises to understand and identify interdependencies will be designed and implemented to disseminate information to all partners. This process will be a continual effort as interdependencies and priorities can be dynamic and situational,

State and local government should coordinate energy assurance planning efforts prior to a catastrophic event. State and local governments need to ensure they are utilizing existing intergovernmental relationships and structures for communicating during an event. Establishing and affirming these relationships will limit the creation of stove pipes, reduce duplication of

efforts, and enhance the ability of governments to coordinate policies (such as fuel distribution) and programs when necessary.

Communicate restoration processes and schedules to public officials and customers.

Government officials need to understand restoration processes and timelines in order to assist citizens during prolonged outages. Utilities should develop and exercise Communications Plans which inform government officials, as well as customers, as to their restoration timelines and priorities. If information is incomplete or unavailable, explanation should be provided.

Exercise Continuity of Operations Plans (COOPs) with suppliers and customers. Providers of critical energy services should exercise their COOP and their Emergency Response Plans with suppliers and customers to identify gaps and critical interdependencies that could impact response and restoration to a major event. Lessons learned from these exercises can inform their planning for preparedness, response, and restoration, as well as those of their partners.

Conduct regional exercises with State and local governments, and energy sector owners and operators. Exercising response plans, including communications, prioritization, and mobilization at a regional level helps educate all stakeholders as to restoration processes and requirements, the relationships necessary to facilitate response, and the challenges that can be expected. DOE will design and implement exercises focused on events that specifically impact critical energy assets and interdependencies. These exercises should also be designed to educate policy and decision makers about the energy infrastructure, fuel markets and to improve their ability to make informed decisions during a response.

Leverage technology to improve response and communications. Federal government should work with public and private sector responders to identify effective communication and response technologies, as well as processes and opportunities for technology solutions to improve information sharing.

Access and Resources

Use the Defense Production Act (DPA) to obtain critical supplies. In an event affecting a large geographic region, the demand for critical components is high, and access to those components can become constrained as demand grows. The DPA is a tool that can help acquire supplies in a timely manner to assist restoration in extreme events. DOE can develop a better understanding of how and when the DPA can be used, as well as the pros and cons for sector partners.

Designate energy sector restoration crews as first responders, eligible to be granted priority for fuel distribution. During events, when fuel is a scarce commodity, restoration crews (electric, oil, and natural gas) require fuel for vehicles and equipment in order to perform restoration efforts. Without adequate access to fuels, response can be seriously hindered. During the hurricane response, electrical workers were given “first responder” status which enabled them to be more effective. Other repair crews did not have this status. The Federal government should coordinate with State and local governments to ensure that refinery and terminal repair

crews are given first responder status and appropriate credentials to enter damaged work zones quickly.

Create a corps of certified electricians and other ancillary services required during restoration activities. DOE can coordinate with States and critical infrastructure owners and operators to understand what types of ancillary services, such as electricians, are needed to facilitate restoration activities. Identifying skills and individuals in advance to create a corps of qualified professionals will help shorten restoration times.

Work with State and local governments to develop guidelines for law enforcement to follow which allow access for utility restoration crews. A recurring problem following natural disasters is the difficulty crews involved in restoration, such as utility crews have in accessing affected areas to begin restoration. DOE should work with State and local governments and industry to develop guidelines for law enforcement to use following future events which will allow access for restoration crews without compromising public safety.

Revise policies on how to deal with short-term and prolonged fuel shortages. States should identify key gasoline retail stations to provide fuel for first responders and consumers along evacuation routes. Those stations should be required to have electric power generator hook-up capability.

Assess the value of a refined product reserve. DOE should work with sector partners to perform cost-benefit analysis of a regional refined product reserve versus stockpile requirements for private sector entities (such as those in Europe). The analysis will consider, among other factors, existing legislation and authorities, siting issues, fuel types and dependent supplies, and market forces.

Create a dedicated DOE/ESF-12 response corps. Permanently deployed DOE responders can provide on-the-ground situational awareness, established relationships with State and local energy sector partners, and first-hand system knowledge at the State and local level. These responders can facilitate energy-sector specific response and restoration at the local level, affording DOE leadership first-hand reporting during an event.

Establish, in cooperation with States, the technical and financial conditions needed for retail gasoline stations to receive generator power. The fuel needs of emergency responders, as well as the public, necessitate more timely restoration for gasoline service stations. One option to promote restoration would be generator power, supplied either commercially or by governments. However, site-specific electric systems need to be configured to receive power and financial incentives need to be in place to encourage these adaptations. Governments should investigate what could be done at the State level to create favorable conditions to make these changes.

Mutual Assistance Arrangement

Clarify Anti-Trust Laws. DOE General Counsel and other relevant Federal agencies should perform a review of Federal anti-trust laws governing the oil and gas industries. Acceptable

practices and policies will be documented, in regard to mutual assistance and other coordination that is allowable in response to energy emergencies.

Establish mutual-assistance relationships with the owners and operators of critical energy infrastructure before an event occurs. These relationships and networks should be established during steady-state operations to facilitate communication when an event occurs.

Review mutual aid agreements and the processes to receive and manage those agreements. All electric companies should have mutual aid agreements in place. Those agreements need to be current, reviewed, and ready to be executed so that companies can receive mutual assistance workers if and when they are needed. Companies need to understand the requirements for staging areas, coordination of restoration activities across their systems with mutual assistance crews, and the processes to manage workers and workloads.

Additional Recommendations

Establish standards and guidelines for fuels facilities. The fuels industry can establish industry standards and technical guidelines for all oil terminals, pipelines, and service stations based on industry-determined criteria to install transfer switches or other systems needed for facilities to accept generator power. When commercial power to a site is lost, generator power can be provided to those critical facilities that are configured to receive it. Industry standards for generator and other types of alternative power can decrease the time it takes to match available resources to needs in an event. Conclusions may also lead to changes at facilities that are not currently configured for generator power.

Strengthen resiliency and hardening of the system. Industry owners and operators have a responsibility to assess their system vulnerabilities to natural disasters in areas that are historically prone to these events. As the restoration process continues in New Jersey and New York, owners and operators should explore opportunities that could enhance resilience. These include such options as elevating substations, building berms, raising switching gear, and other measures which have proven effective in other areas of the country. Owners and operators should also have on-site backup electric power generation to operate facilities.

Consider alternative system configurations for critical facilities. For those facilities with critical needs, such as hospitals, fuel supply terminals or other critical sites, owners and operators should coordinate with energy providers to consider potential alternative system configurations to enhance the reliability of power. Potential solutions could include dedicated circuits, distributed generation, or combined heat and power units.

Revise current building and rehabilitation codes. Building planners and government officials will assess current codes to determine if they can be updated to enhance reliability and resilience.

VI. Next Steps

The response to Hurricane Sandy and the following Nor'easter is ongoing, both in the affected communities and within the Federal government. As part of this response, DOE will begin implementing the actions recommended in this report. Specific next steps are detailed below.

- Hold an After-Action meeting with all stakeholders to examine the overarching lessons learned and areas for improvement.
- Coordinate with energy sector stakeholders to identify what information is needed before, during, and after an event, and, ascertain which communication mediums should ideally be used to deliver that information.
- Identify what can be done, under existing laws, to facilitate access to critical supplies for restoration of critical services (such as electric power). Identify any existing laws that need to be amended or new laws promulgated, to facilitate such access.
- Facilitate communication of policies and practices which support preparedness and resilience between energy sector owners and operators through the Sector Coordinating Councils and trade associations.

While this list is not comprehensive, it does provide an initial set of activities in which DOE can engage, given current resources. The results of these activities should be shared with partners. They should inform future activities and decisions which can inform policy options to enhance preparedness, response, and recovery for future events.