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Robert M. Hallman and Ke Wei

JULY 2016



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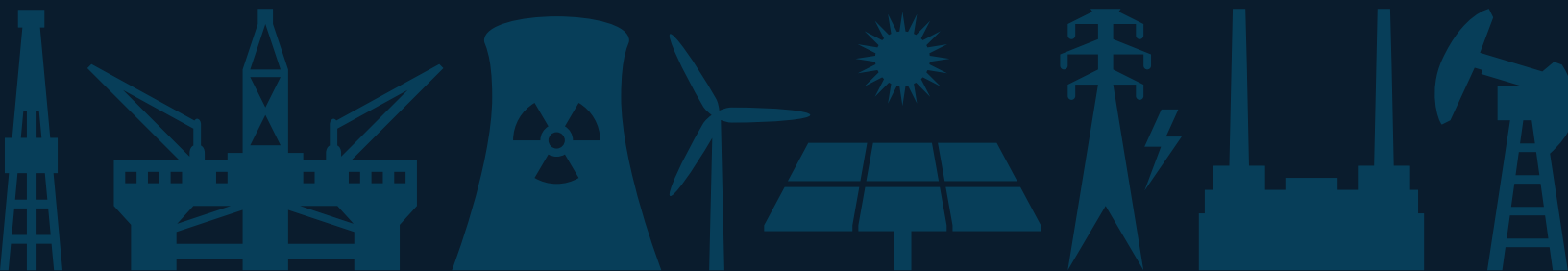
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**\*Robert M. Hallman** is a fellow at the Center on Global Energy Policy at Columbia University's School of International and Public Affairs (CGEP). He has over thirty years of experience in energy and environmental policy and legal matters. Immediately prior to joining CGEP, he served as senior advisor for energy and the environment to New York State Governor Andrew Cuomo. Earlier, he was a partner at the law firm of Cahill Gordon & Reindel, where he led its national and international energy and environmental practice, held positions in these fields in federal and local government, and served as chair of the board of the nonpartisan New York State League of Conservation Voters. Mr. Hallman also currently is a senior fellow at the Getches-Wilkinson Center for Natural Resources, Energy, and the Environment at the University of Colorado Law School at Boulder, Colorado.

**Ke Wei** managed the fuel resilience research program and led its Women in Energy program at the Center on Global Energy Policy at Columbia University's School of International and Public Affairs (CGEP) during the time she worked on this report. Previously, she was an associate at McKinsey & Company's New York office, supporting public and private sector clients on a range of strategic and organizational challenges. She has also worked as an editor for the Foreign Policy Association. Her work on this report concluded in December 2015, when she left CGEP to assume her current position as the Senior Policy Advisor for Energy at the New York City Mayor's Office of Recovery and Resiliency.

## FOREWORD

This research project was initiated by the Center on Global Energy Policy (CGEP) at Columbia University's School of International and Public Affairs in connection with its work on the resiliency of the energy sector and in part at the request of the New York City Mayor's Office of Recovery and Resiliency as it pursues strategies to buttress the New York Tri-state region's fuel supply system from the weaknesses exposed during Superstorm Sandy.<sup>1</sup> In May 2014, CGEP commenced an evaluation of obstacles and means to enhance the regional resilience of the liquid fuels supply chain serving the New York Tri-state area. To identify a common set of regional challenges and priorities, CGEP convened its first fuel supply chain resilience forum in May 2014, featuring senior-level owners and operators of key fuel supply chain components and related power supplies, and senior government officials from relevant federal, state, and local agencies.<sup>2</sup> Participants identified four priority topics warranting priority regional attention, including (1) enhancing regional situational awareness for fuel emergencies; (2) increasing the resilience of critical fuel supply chain infrastructure; (3) coordinating and expediting regulatory relief; (4) coordinating and operationalizing governmental refined product reserves. CGEP convened three additional forums (in October 2014,<sup>3</sup> March 2015, and September 2015) among senior-level stakeholders to identify and discuss next steps to address these topics from a regional perspective, supplemented with additional research conducted by CGEP.<sup>4</sup> This report (Report), prepared by CGEP is based on this work and focuses specifically on the first priority topic: enhancing regional situational awareness to address fuel emergencies, including its significance in addressing the other three priority areas. Major research on this report was concluded by Robert Hallman and Ke Wei in December 2015, with revisions based on reviews and further work finalized by Hallman in June 2016.



## ACKNOWLEDGMENTS

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This report is based solely on the research of the authors and is their sole responsibility. It does not necessarily represent the views of the Center on Global Energy Policy at Columbia University's School of International and Public Affairs.

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## EXECUTIVE SUMMARY

The large-scale disruption of fuel supplies caused by Superstorm Sandy brought the vulnerabilities of the New York Tri-state fuel supply system into sharp relief. In the three and one-half years since the storm, concerns about extreme weather and overall energy security have only grown, leading policymakers at all levels, fuel suppliers to the region and related power providers to examine how this system can be strengthened against future risks.

In a series of forums with senior-level, regional industry and government officials convened by the Center on Global Energy Policy at Columbia University's School of International and Public Affairs (CGEP) initiated in 2014, public sector situational awareness was identified as a critical problem exposed by Sandy. Situational awareness, in this context, refers to the quick, reliable, and efficient communication of information between the private sector and the public sector critical to understanding the fuel supply system in real time and restoring its operations during emergencies. Access to this information is essential for public officials to evaluate and implement response measures as well as to credibly inform the public of rapidly changing conditions, and for private and public sector coordination.

Since Sandy, efforts have been made to enhance public sector understanding of the fuel supply system, improve voluntary engagement between industry and government, secure fuel supplies for priority services, and facilitate the restoration of power to critical fuel supply assets during crises. But given the growing threats to the system, more work needs to be done.

This report puts forward a series of recommendations to improve communications and overall situational awareness between the private and public sectors to facilitate effective response to fuel emergencies. The Report concludes that the current voluntary system of information sharing is inadequate to the needs of the public sector and recommends creating mandatory requirements at various levels to address fuel crises.

It also proposes further efforts to increase the understanding of the Tri-state fuel supply system, including the adequacy of critical asset resiliency, and to improve communications and coordination among crucial public sector officials to streamline necessary regulatory relief to move fuel and use of government-owned fuel reserves.

Based on the CGEP forums and extensive research by the authors, these critical steps ensure the government has the information it needs when it needs it to make and carry out decisions to protect the public good during these fast-moving situations, including deference to market solutions that serve common objectives.

The market plays an important role in responding to fuel disruptions. The private sector may have concerns regarding disclosure of proprietary information, potential antitrust issues, and excessive regulation. The sharing of proprietary information with the government is not a new concept, however, and energy companies are regularly required to provide similar information to government agencies. This paper stresses the need for strict limitations on the use of proprietary information needed for emergency response as well as on its distribution, and the need to tailor reporting requirements to alleviate antitrust concerns. In addition, this report recommends:

- Government and industry should work together to identify and prioritize critical fuel supply chain infrastructure and distribution channels, including related power supply and other interdependencies, and their vulnerabilities. Government and industry contacts with critical information and decision-making power during emergencies should be identified, and the resulting contact lists should be regularly updated and distributed. Formal coordination and communication between electric utilities and their petroleum sector customers should be established, including periodic drills to improve response to fuel disruptions.
- The Department of Energy (DOE) should establish requirements for industry to report critical baseline and real-time information on a facility- and company-specific basis, and should share this information with relevant federal and state officials, with safeguards to protect proprietary and security-sensitive information. States should similarly establish supplemental information-reporting requirements for industry and share this information with relevant federal and other state officials as needed, to plan for and respond to fuel emergencies. Legislation recently introduced in the New York State legislature requiring registration and reporting by major fuel suppliers and pipeline operators of base-line and real-time information essential to responding to energy emergencies provides a useful guide for state action.

- The DOE's capability to lead and coordinate public sector situational awareness on national and regional levels should be enhanced. Pending DOE proposals to establish a permanent Energy Response and Operations Center; expand its capacity to secure and share real-time, actionable information on critical infrastructure with key stakeholders; establish permanent representatives in the field to direct regional information gathering and resilience enhancement efforts; and provide increased funding and technical assistance to state energy officials, should be pursued aggressively. In addition, responsibility for energy sector emergency preparedness and response at each level of government should be clarified.
- The public sector should be given access to private sector business continuity and emergency response plans for fuel emergencies regarding critical infrastructure as well as privately arranged efforts by critical fuel suppliers to allocate supplies to address fuel disruptions. This information should be subject to appropriate protection for demonstrated proprietary information.
- New York State and New Jersey should enter into a Memorandum of Understanding to formalize joint gathering and sharing of critical information and coordination of response plans to address fuel emergencies affecting the New York Tri-state area. These efforts should include coordination with and other appropriate involvement by New York City as well as DOE and the United States Department of Homeland Security (DHS).
- DOE should hold and lead regional drills and exercises with senior public sector and private sector stakeholders, including the power sector, to address fuel emergencies. States with interconnected fuel systems should also hold periodic drills and exercises with industry. New York and New Jersey should formally agree to the joint gathering and sharing of critical information and coordination of response efforts for Tri-state fuel emergencies. As appropriate, New York City, DOE, and the Department of Homeland Security (DHS) should participate or coordinate in these activities.
- DOE and lead energy agencies at the state level, as well as in New York City, should establish permanent fuels task forces to facilitate coordination of planning and response efforts such as regulatory relief, administration of refined product reserves, and assessment of critical infrastructure resiliency, and as appropriate, periodically include industry representatives.
- Owners and operators of fuel facilities and related power suppliers should participate in voluntary regional resiliency assessments of critical energy infrastructure under the leadership of the DHS and DOE, such as the assessment now underway regarding the fuel supply system serving New York State and the one completed last year for New Jersey's petroleum sector. Such assessments can improve discussions between the public and private sectors on the resilience of infrastructure, risk assessment and predictive tools, developing metrics for measuring resilience, and identifying best practices as well as other options to improve critical infrastructure resiliency, including related costs and financing options.

Implementation of these recommendations will require committed and sustained leadership among senior-level, public and private stakeholders, and allocation of sufficient funding, technical and other resources at all governmental levels.



## INTRODUCTION

Growing concerns about security and extreme weather-related risks have put the spotlight on the vulnerabilities and interdependencies of power and fuels infrastructure in the United States. The regional nature of fuel infrastructure and supply chains, underscored by events such as Superstorm Sandy, has also reinforced the need for regional approaches to fuel system resiliency.

A regional approach is essential for the New York Tri-state area as its liquid fuels hub is the most complex and dynamic in the nation, with critical components spread across multiple state and local jurisdictions. New York State consumes about 600,000 barrels, or 25.2 million gallons, of liquid fuels per day. All this fuel is produced in and transported from other states and countries, including several refineries in New Jersey, Pennsylvania, and Delaware as well as refineries along the Gulf Coast and abroad. Petroleum products are delivered to the area primarily via (1) the Colonial and Buckeye pipeline systems—a circuit running from the Gulf Coast to Linden, New Jersey, and from there to various points in New York, New Jersey, and Pennsylvania, and (2) marine tankers and barges traveling from the Gulf Coast and abroad into the Port of New York and New Jersey, which houses fuel terminals with a combined storage capacity exceeding 70 million barrels.

Improving situational awareness—the ability to gather, evaluate, and share relevant information in a timely matter regarding critical fuel infrastructure and related market activities—is critical to facilitating regional coordination of responses to fuel emergencies and longer-term fuel resiliency efforts. Effective situational awareness allows decision-makers to determine what public sector actions, if any, may be required in the event of a fuel disruption, including releases of government-owned refined product reserves to expediting regulatory relief to the private sector to move fuel into the market. It also helps government to coordinate actions with the industry and to effectively communicate with the public.

When Superstorm Sandy (“Sandy”) hit the New York Tri-state region in October 2012 with unprecedented force, it wreaked havoc on regional infrastructure, including assets that were essential for fuel supply and distribution.<sup>5</sup> Due to the storm’s anticipated and real impacts, the President authorized emergency

declarations for 11 states and the District of Columbia. Within days, Sandy highlighted the region’s dependence on gasoline, diesel fuel, and heating oil by exposing vulnerabilities in the supply chain, including its reliance on the electric grid, and its regional interdependencies.<sup>5</sup>

Despite the emergency declaration, at the time Sandy made landfall,

- there were no requirements for the owners and operators of refineries, pipelines, terminals, or retail fuel distributors to report to public officials on the status and operations of these critical assets, fuel availability, and business response plans on a real-time basis;<sup>7</sup>
- electric utilities were not obligated to restore power to critical fuel supply infrastructure on a priority basis;<sup>8</sup>
- there was no formal agreement (e.g., a Memorandum of Understanding), system (e.g., agreed protocol and defined critical data), or mechanism (e.g., secure electronic portal) in place for officials of neighboring states with interdependent fuel supply chains, such as New Jersey and New York, to share critical fuel information or to coordinate responses (e.g., issuing regulatory relief to move fuel) regarding the fuel emergency.

During Sandy, situational awareness was highly variable among all stakeholders. Access to relevant information was uneven and difficult to obtain on a near real-time basis. Information was gathered largely on an ad hoc, voluntary basis from the private sector by the public sector, primarily on the basis of preexisting relationships among public officials and industry representatives. For example, in New York City, the Mayor’s office and Department of City Administrative Services “relied on professional contacts, crowd-sourced data and phone interviews to slowly put together an accurate picture.”<sup>9</sup> At times, natural staff turnover as well as lack of current contact lists in industry and public sector, combined with changes in organizational ownership and structures, created confusion and difficulties in identifying responsible contacts and obtaining critical information, and wasted resources by causing redundant calls and queries.

Several senior-level stakeholders at the CGEP forums held after Sandy to address the resilience of the New York Tri-state fuel system acknowledged that the voluntary informal gathering and sharing of information was inefficient and ill-suited for securing the real-time, facility-specific information necessary for an effective and coordinated response to Sandy.<sup>10</sup> For example, it contributed to delays in response activities such as granting relief from environmental, trucking, and marine transport regulations needed to facilitate fuel distribution.

At the CGEP forums, most stakeholders agreed that the public sector would benefit from enhanced, periodic engagement with industry regarding the nature and operation of the regional liquid fuels supply chain; authoritative contacts should be established and periodically updated by government and by industry to facilitate effective, timely sharing of accurate information during fuel emergencies; and regional coordination is a key ingredient for effective response to fuel emergencies in the New York Tri-state area.<sup>11</sup>

Several industry representatives stressed the need to rely primarily on the market and private sector as the most efficient means to allocate available supplies, urging that once power from the grid had been restored to key infrastructure during Sandy, the market returned to normal in a few weeks.<sup>12</sup> Additionally, they expressed a reluctance to share certain data with government for fear of yielding a competitive advantage or possibly risking allegations of antitrust violations. Private sector stakeholders also expressed concerns about what officials would do with detailed supply and market data and cited the risk that government would urge actions that could disrupt the market or require steps by them that were uneconomic, such as forcing them to maintain large fuel inventories<sup>13</sup> or purchase supplies at excessive prices.<sup>14</sup>

Balancing the public sector's obligation to protect public health, welfare, and the economy with the benefits of the market and needs of the private sector—especially in the context of addressing fuel emergencies—is a key challenge in formulating and implementing smart, effective emergency management policies.

Since Sandy, efforts have been made by the public sector to enhance understanding of the fuel supply system and develop and reinforce contacts with industry to facilitate voluntary information sharing.<sup>15</sup> Initiatives have been

implemented to identify and enhance the resilience of strategic gas stations, facilitate prompt restoration of power to critical fuel supply infrastructure on a priority basis, improve the grant of regulatory relief to aid fuel distribution, establish government-owned, refined product reserves and to secure fuel supplies for critical services, and identify the principal vulnerabilities of critical fuel supply infrastructure. Certain private sector stakeholders have also undertaken to increase engagement, including designation of knowledgeable liaisons and proposals for joint planning exercises, with states and the federal government, and to enhance backup power systems as well as the resilience of the electrical grid and some other key assets.<sup>16</sup>

Nevertheless, concerns about threats to energy security from extreme weather and other natural and man-made disasters, including physical and cyberattacks associated with terrorism, have continued to grow. Today—more than three years after Sandy—preparedness for and response to fuel emergencies remain fundamentally based on voluntary, not mandatory, sharing of information by industry with the public sector.<sup>17</sup> Regional coordination, moreover, remains largely informal.

This report presents a brief overview of the liquid fuels supply chain serving the New York Tri-state region, examines the challenges presented by the current approach to situational awareness, and describes efforts to date to address them. It concludes with a series of recommendations aimed at maximizing effective gathering, evaluation, and sharing of critical information prior to and during regional fuel emergencies. These actions—designed to strike a reasonable balance between public sector responsibilities and a robust, effectively functioning market and fuel sector—should not only further the success of ongoing initiatives to improve preparedness for and response to fuel emergencies, but pave the way for new ones.

While the report targets the New York Tri-state area, the analysis and recommendations presented can provide a model for other regions of the United States and abroad.

## THE ROLE OF SITUATIONAL AWARENESS

Situational awareness lies at the core of effective emergency preparedness and response. Situational awareness provides a reliable basis for public officials to assess the nature and extent of emergency conditions and effectively inform the public as to response options and appropriate protective measures. Policymakers require baseline and real-time information about critical fuel infrastructure, operations, and relevant market activities to evaluate response options, such as the following:

- Determining damage to, response times, and restoration plans for critical infrastructure;
- Determining whether to provide waivers or no-action determinations that allow for regulatory relief related to fuel products (e.g., US Environmental Protection Agency (EPA) vapor recovery requirements for off-loading fuel from vessels at ports, US Department of Transportation (DOT) restrictions on driver hours of service and state road tolls and vehicle weight requirements for truck transport);
- Redirecting fuel supplies to first responders, other priority users, and/or key retail outlets;
- Coordinating with the private sector regarding reallocating available supplies (“workarounds”) or altering distribution routes based upon where need is greatest or based upon which retail gas stations are operational post-disaster;
- Determining whether releases from state or federal refined product (gasoline, heating oil) reserves are needed;
- Implementing rationing and/or other demand management programs;
- Expediting power restoration to critical facilities;
- Securing and allocating emergency equipment, such as mobile generators, to aid private sector recovery.<sup>18</sup>

A major constraint on expediting regulatory relief post-Sandy was timely access to real-time market information, according to senior-level stakeholders attending the forums.<sup>19</sup> State action in addition to federal government action is often required to secure appropriate regulatory relief.

A prime example of the critical role of situational awareness is EPA’s decision to grant a temporary waiver for eighteen days under the Clean Air Act (CAA) during Sandy to permit use of regular heating oil (heating oil #6 or heating oil #4) instead of ultra-low sulfur diesel fuel (ULSD) in highway and non-road vehicles and non-road equipment used for disaster recovery efforts in the New York metropolitan area and Pennsylvania. To do so, EPA was required by the CAA to find that an “extreme and unusual fuel supply circumstance” existed that prevented distribution of ULSD in these specific geographic areas that was not reasonably foreseeable or the result of imprudent planning by suppliers to these areas.<sup>20</sup> In order to assemble a credible record for this determination, EPA reached out to DOE (which concurred in its findings), state officials, and industry representatives to secure the best available real-time information, since EPA was required to take into account not only the availability of immediate fuel supplies but the dynamic nature of the market<sup>21</sup> and the potential impact of its decision on the market. According to the National Petroleum Council (NPC), EPA can “find it difficult to quickly gather information from industry, which slows down the issuance of fuels waivers and other regulatory relief.”<sup>22</sup>

Another example of the need for real-time information flow from industry to government to secure regulatory relief during Sandy concerns the waiver of the Jones Act (Merchant Marine Act of 1920). This waiver granted an exception that allowed foreign-flag vessels to transport fuel from Gulf Coast refineries to terminals in New York and New Jersey (in effect, increasing the number of ships available to move fuel into the region). Waiver requests are handled by the US Department of Homeland Security (DHS) in consultation with DOE, the Department of Defense (DOD), and the Maritime Administrator at the Department of Transportation (DOT). They require a finding that granting relief is “necessary in the interest of national defense” and that no US-flag vessels are available.<sup>23</sup> DHS together with DOE, DOD, and DOT required real-time information as to market conditions to make such a finding, namely, to determine that there was a fuel emergency and that no US-flag vessels were available to transport fuel from refineries on the Gulf Coast to the East Coast.<sup>24</sup> It took four days to obtain a Jones Act waiver during Sandy.<sup>25</sup> Once a waiver is

granted, it can take 10–14 days to transport products by vessel from the Gulf Coast to the Northeast.<sup>26</sup> Such delays in transporting fuel supplies to impacted regions could be minimized if a clear waiver process, including decision criteria and readily available sources of critical information, were established by DHS in advance of such events.<sup>27</sup>

Senior-level stakeholders at two of the CGEP forums also noted that assessment of the need for and effective timing of releases of fuel from government heating oil and gasoline reserves serving the New York Tri-state region depends on a reliable, timely flow of market information and coordination between industry and public officials in charge of the reserves.<sup>28</sup>

### **The Limits of a Voluntary System**

The current voluntary approach of public officials for securing critical information during fuel emergencies by calling on trusted industry representatives arose at a time when the risks of emergencies were perceived as few and generally manageable, and the industry was highly concentrated and controlled largely by a limited number of integrated oil and gas companies.<sup>29</sup>

These conditions however have changed dramatically over the last several decades. The current risks of extreme weather, other natural disasters, and terrorism—combined with the complex and dynamic nature of the fuel supply chain and the fragmented nature of the industry today—bear no reasonable relation to and present entirely different and orders of magnitude more challenging conditions in which to plan for and respond to emergencies than those which prevailed when voluntary information sharing was the norm.

The challenges of collecting critical information from industry under a voluntary system are further exacerbated by the complexity of the fuel supply chain serving the New York Tri-state region as well as the increasing diversification and fragmentation of the retail distribution and fuel storage sectors of the market. The growing number of independent owners and operators and private stakeholders clearly reduces the efficacy of voluntary systems.<sup>30</sup> For example, during Superstorm Sandy, several public officials had to resort to social media, such as the app Gas Buddy, for information regarding the operational status of retail gas stations in the New York Tri-state area.

Also, the fuels industry—especially in comparison to other lifeline sectors such as electricity (power), water, and communications—is relatively unregulated. The competitive market environment creates inherent tension between what company-specific information or facility-specific information the industry is comfortable sharing during emergencies, and what the public sector may consider necessary to protect public health and welfare. In this connection, New York City observed post-Sandy that there is “little regulatory oversight” over the array of assets with varied owners in the fuel supply chain “with respect to infrastructure climate resilience, and almost no operational information is shared by owners, either with each other or third parties...In an emergency, not being able to access information needed to gain a comprehensive understanding of the regional challenges will hamper recovery and restoration.”<sup>31</sup>

Established relationships, trust, and public–private partnerships have been and remain valuable tools for gathering information,<sup>32</sup> but are not sufficient to serve as the core of an effective, reliable, and credible effort to address fuel emergencies, as revealed during Sandy.

Voluntary systems of information sharing simply cannot be relied upon during emergency conditions when the best laid plans are by definition challenged and the “fog of war” often predominates. Clear, established, secure, and automatic channels of communication, protocols, and predefined information flows are essential to minimize disruption and maximize situational awareness.

Moreover, voluntary information sharing provides only limited certainty to public sector officials of the type and reliability of information they will receive, and how, when, and from whom they will receive it. This inherently limits their ability to effectively develop response plans or communicate to the public during fuel disruptions. This system can also be frustrating for industry, which needs ready access to government assessments and proposed actions. During Sandy, both government officials and industry representatives had difficulty in quickly identifying knowledgeable, senior-level people to consult. The sheer volume of calls and failed connections slowed recovery efforts.<sup>33</sup>



## GAPS IN SITUATIONAL AWARENESS EXPOSED BY SUPERSTORM SANDY

Superstorm Sandy exposed fundamental gaps in access to critical information and the means for collecting it under emergency conditions, which increased the difficulty for policymakers to assess and formulate responses to the widespread fuel supply disruption.

Many of these challenges were identified in Sandy after-action reports issued by the public sector and, as noted above, echoed in forums convened by CGEP among senior-level public and private sector stakeholders.<sup>34</sup>

The major gaps highlighted by Sandy are discussed below, followed by a review of initiatives to address these gaps.<sup>35</sup>

### **Gap 1: Limited information regarding the liquid fuels supply chain and related fuel markets among public sector officials**<sup>36</sup>

During Sandy, in many cases government officials struggled to obtain comprehensive lists, maps, or schematics that identified critical infrastructure, in particular terminals and key interdependencies (such as supporting power systems) and product flows. Officials also had difficulty identifying and contacting individuals who had appropriate decision-making authority over and operating knowledge of critical infrastructure. In many cases they had limited real-time access to information on fuel inventories, refined product flows in and out of the region, and distribution within the region.

There was also uneven understanding of the workings of the fuel market. For example, when public officials sought information from terminals regarding inventories and their availability, they often were informed that terminal owners do not own the product that is stored there and are usually not in a position to provide information as to who owns it, how it is allocated, or how it will be distributed to customers. Also with limited exceptions, before Sandy, the public and private sectors did not perform joint drills or exercises to test and coordinate emergency preparedness and response for widespread fuel supply disruptions.

### **Gap 2: Lack of access at the federal level to real-time information for critical facilities/operations essential to energy emergency preparedness and response**<sup>37</sup>

#### **Information Gathering through DOE/EIA**

Under the National Emergency Response Framework overseen by the US Department of Homeland Security (DHS), DOE is the lead federal agency responsible for coordinating emergency preparedness for the energy sector. A key element of this task is collection, evaluation, and sharing of information on energy system damage, impacts, and the energy restoration process.<sup>38</sup> Within DOE, the Office of Electricity Delivery and Energy Reliability (OE) is the lead office for directing these functions.<sup>39</sup> During Sandy, DOE collected close to real-time information almost entirely based on voluntary reporting by industry. DOE reached out to individuals with whom it had existing relationships.<sup>40</sup>

The Energy Information Administration (EIA), located within DOE, is the primary source of energy information at the federal level. It was established in 1977 as an independent statistical agency and is generally responsible for collecting, analyzing, and disseminating energy information to promote sound policymaking, efficient markets, and public understanding of energy.<sup>41</sup> To meet these objectives, EIA has broad authority to mandate reporting of information from the energy sectors, as well as to assemble, evaluate, and analyze that data.<sup>42</sup> However, the penalties for failure to report information requested are small.<sup>43</sup> Public disclosure by EIA of information it collects is subject to strict limitations—including potentially criminal sanctions—intended to protect demonstrated proprietary information.<sup>44</sup>

EIA generally collects information periodically—not in real time—using surveys to gather and compile aggregated statistical information. EIA has promulgated more than twenty survey forms to obtain information from the petroleum sector, including data on refineries, bulk terminals and blending plants, pipelines, importers of refined products, distributors and resellers of refined products, and tanker and barge movements of refined products from companies with custody of the products.<sup>45</sup> If a survey extends to more than nine

respondents, its use requires DOE to first take a number of administrative steps, including

- obtain comments from other federal agencies and the public, and
- obtain approval by the Office of Management and Budget (OMB) pursuant to the Paper Work Reduction Act of 1995 (PWRA).<sup>46</sup>

With some exceptions, EIA publishes collected data in aggregated form, not by company or by facility, and not in real time. For example, petroleum stock levels for terminals are published weekly but only aggregated by the Petroleum Administration for Defense District (PADD) and sub-PADD district.<sup>47</sup> State-level inventories at select terminals are published monthly by EIA in aggregated form, on a two-month delay.<sup>48</sup>

EIA appears to have authority to gather data on a more real-time basis, but such action also is subject to procedural hurdles, including prior emergency review and approval of information requests by the Office of Management and Budget (OMB) under the PWRA.<sup>49</sup> Subject to restrictions on public disclosure, EIA can provide company-specific data “to other DOE offices for the purpose of examining specific petroleum operations in the context of emergency response planning and actual emergencies.”<sup>50</sup> EIA also has authority to provide this information to state officials subject to certain conditions, including protection for demonstrated proprietary information, but reportedly EIA has been reluctant to do so owing to industry concerns.<sup>51</sup>

In addition to its ability to obtain emergency approvals from OMB, EIA can seek—and in the past EIA has requested—contingency, standby OMB approval for targeted surveys to anticipate fuel emergencies with use of the surveys triggered by determination of need by EIA’s administrator. For example, this was done by EIA in 2001 to address potential natural gas shortages during heating seasons—which it had encountered for the prior three years.<sup>52</sup> In 2014, during threats of major hurricanes striking Hawaii, EIA was able to gather a variety of detailed, real-time data such as crude oil shipments bound for the islands as well as local fuel inventory data that are not normally gathered.<sup>53</sup> However, these procedures are cumbersome at best and not ideal for addressing emergency conditions.

In sum, EIA is authorized to and does collect significant amounts of information from the petroleum sector on a mandatory basis. However, EIA was not established and is not currently structured to address energy emergencies and has no formal process in place to collect and share real-time, facility- and/or company-specific data for emergency preparedness and response.<sup>54</sup> EIA does publish some data broken down by state, but it is too generic for use in emergency conditions where site- and company-specific data is needed, especially at the state and local levels.<sup>55</sup>

### DOE/EIA Efforts to Respond to Sandy

In response to Sandy, DOE activated and staffed an Energy Response Center at DOE headquarters in Washington, DC, and deployed additional staff to Federal Emergency Management Agency (FEMA)<sup>56</sup> sites in Massachusetts, New Jersey, Pennsylvania, and to the New York State Emergency Operations Center in Albany.<sup>57</sup>

During Sandy, EIA obtained emergency OMB approval in two days (with major support from varied senior-level stakeholders) to add questions to an existing survey of gasoline prices (Form EIA-878) to address the availability of gasoline at and operational status of retail gas stations, including reasons for any operational difficulties. The purpose was to assess supplies available at the representative sample of stations used for the price survey in the New York–Northern New Jersey–Long Island portion of the New York–New Jersey–Connecticut Metropolitan Statistical Area. The EIA collected data daily from November 2–9, 2012, and estimated the percentage of stations without gasoline in the sampled area using a “composite number not designed to reflect the specific experience of more severely affected areas.”<sup>58</sup> EIA obtained this information and provided it to DOE’s emergency response team, who distributed it to appropriate state and local authorities.

DOE’s Office of Electricity Delivery and Energy Reliability (OE) issued six daily situation reports that included lists of specific pipelines, refineries, and terminals impacted by Sandy, and their operational status. They also reported on the status of power facilities.<sup>59</sup> OE obtained this information voluntarily from respondents, as well as through the press and/or some combination of state and EIA sources.

In addition, EIA—“with the help of the NPC and with the voluntary participation of the industry”—

did a survey of product flows in and out of the New York harbor area to compare pre- and post-Sandy fuel product flows. EIA gathered the information from industry voluntarily based on the survey on November 13, 2012 (fifteen days after Sandy hit), from terminals representing 98 percent of storage in the area and published it November 21, 2012.<sup>60</sup>

DOE's struggles to maintain situational awareness of the fuel disruption in the New York Tri-state region on a real-time, facility- and company-specific basis are described in its overview of its response to Sandy. DOE noted "inadequate situational awareness of fuel supplies" at the federal level and that there were significant information gaps.<sup>61</sup> It concluded:

"Some of the major areas where improvement is needed is in availability of information of energy supplies and communication of restoration schedules...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."<sup>62</sup>

DOE highlighted the critical nature of and lack of access to real-time information:

"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...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."<sup>63</sup>

### **GAP 3: Lack of access at the state level to real-time information for critical facilities/operations essential to emergency preparedness and response<sup>64</sup>**

As discussed earlier, during and immediately after Sandy, New York State, New Jersey, and New York City relied on voluntary gathering of information from industry, the federal government, each other, and other sources, which required ad hoc approaches to sharing and assessing information in order to respond to the fuel disruption.<sup>65</sup> Public sector officials leveraged relationships they had developed with the private sector.

In New Jersey, prior to and during Sandy, voluntary information sharing with industry was further facilitated by:<sup>66</sup>

- including petroleum industry association representatives voluntarily within its Emergency Operations Center's Private Sector Desk;
- leveraging long-term relationships between the New Jersey Office of Homeland Security and Preparedness, including an official responsible specifically for the petroleum sector, and a broad array of industry contacts from the vast network of fuel supply infrastructure located in the state;
- consulting petroleum industry representatives voluntarily included on the New Jersey Infrastructure Advisory Committee (IAC), an official subgroup of the State of New Jersey Domestic Preparedness Task Force (public sector body) established prior to Sandy, composed of private industry representatives, which acts as a liaison to a variety of private industry sectors throughout New Jersey.<sup>67</sup>

In New York State and New Jersey, there are no mandatory requirements for the liquid fuels industry or critical fuel infrastructure owners/operators to report information to the public sector to prepare for and respond to fuel emergencies.<sup>68</sup>

### **GAP 4: Lack of access at the federal and state levels to private sector emergency response and business continuity plans, as well as privately arranged market-based efforts triggered by fuel supply emergencies<sup>69</sup>**

Members of the fuel industry generally prepare and maintain business continuity and emergency response plans to address man-made and natural disasters. Plans identify key dependencies and areas of risk, including how to maintain or, if necessary, curtail operations depending on the nature, magnitude, and impacts of the emergency or disaster.<sup>70</sup> Hurricane plans, for example, usually adopt a phased approach for emergency management with priority objectives, and describe individual roles and responsibilities prior to, during, and after a hurricane arrival.<sup>71</sup>

Industry is not required and generally does not provide its business continuity or emergency response plans to public sector officials, largely due to concerns regarding potential disclosure of proprietary information and/or that the use of this information

could lead to interventions by the public sector that could adversely impact market solutions.<sup>72</sup> For similar reasons, the private sector has generally not notified the public sector of privately planned efforts, such as workarounds to reallocate supplies within the market during emergencies.

**GAP 5: Lack of a permanent structure and formal process for sharing information and coordinating preparedness and responses to fuel supply emergencies among states in the New York Tri-state area**

The New York Tri-state liquid fuels supply chain is an incredibly complex, interconnected system. New York State is highly dependent on critical infrastructure and fuel distribution networks located outside the state. As noted by New York City following Sandy: “The fuel supply shortage after Sandy was caused mainly by damage to infrastructure in New Jersey, where the City and State of New York have no regulatory or legislative authority.”<sup>73</sup>

Despite the regional-nature, related interdependencies and complexity of this supply chain, there is no formal agreement in place committing policymakers in neighboring states to share relevant information to address fuel emergencies. During Sandy, this complicated efforts across state and local governments to obtain information from the private sector and one another, further delaying the efficacy of response.<sup>74</sup> The lack of a formal regional structure also hindered the ability to coordinate planning and response efforts among affected states, including efforts to locate and move fuel from one jurisdiction to another, and related steps to waive regulatory requirements to expedite fuel deliveries.

There are periodic efforts among specific energy or homeland security officials and/or departments to secure updates on a voluntary basis from neighboring states with respect to emergency preparedness and response. For example, the Massachusetts’s Energy Office holds periodic conference calls with New York and other New England states regarding emergency preparedness.<sup>75</sup> In New York, the New York State Energy Research and Development Authority (NYSERDA) maintains a liaison with “other states’ emergency planners, particularly in the neighboring New England and Mid-Atlantic regions.”<sup>76</sup>

Various groups convene meetings of regional public sector stakeholders (sometimes with private sector participation) to coordinate emergency planning; however, to date none appear to focus directly on fuel supply chain issues. Notable groups and forums include the All-Hazards Consortium,<sup>77</sup> various regional bodies set up under DHS’s National Infrastructure Protection Plan (such as the DHS Regional Consortium Coordinating Council) and DHS State, Local, Tribal, and Territorial Government Coordinating Councils.<sup>78</sup> The National Association of State Energy Officials (NASEO) does conduct multistate exercises from time to time, although these do not necessarily focus on the Tri-state region or fuel supply chain issues.<sup>79</sup>

**GAP 6: Lack of plans by electric utilities to prioritize restoration of power to critical fuel assets during emergencies**

As noted earlier, the disruption of grid-supplied electric power to critical pipelines and terminals was a major contributor to the widespread fuel disruption resulting from Sandy. Failure to promptly restore power to fuel supply infrastructure hindered effective response by the public and private sectors.<sup>80</sup>

Prior to Sandy, electric utilities in New York and New Jersey were not required to identify critical fuel infrastructure in their service territories and include these facilities on their lists of critical customers entitled to priority restoration of service. Also, there were no formal communication channels or processes to facilitate communications between the power suppliers and owners/operators of these critical assets triggered in emergency conditions.<sup>81</sup> The New York State Public Service Commission (PSC)<sup>82</sup> noted: “Hurricane Sandy highlighted the need for effective electric emergency plans.”<sup>83</sup>

Responsibility for the resilience, maintenance, and operation of electric systems beyond the customer fence—on the property of petroleum sector customers—lies with the owners and operators of fuel supply chain assets. In addition to power outages caused by loss of grid-supplied power, electricity disruptions also resulted from damage caused by the storm surge to onsite electrical equipment.<sup>84</sup>



## POST-SANDY INITIATIVES TO ENHANCE SITUATIONAL AWARENESS

It is important to note that despite the problems encountered during Sandy, in the years after there have been efforts to improve information gathering and sharing, focusing on increasing public sector knowledge and capacity to understand and assess fuel system operations. There have also been moves to strengthen relationships between public sector and private sector energy owners and operators to facilitate voluntary reporting.

### DOE Initiatives

#### *NPC Recommendations*

One of the most significant initiatives by DOE to improve its capacity to lead the federal energy emergency preparedness and response effort and maximize situational awareness is its effort to implement recommendations set forth in the National Petroleum Council's December 2014 report "Enhancing Emergency Preparedness for Natural Disasters," commissioned by DOE Secretary Ernest Moniz.<sup>85</sup>

The National Petroleum Council (NPC) found it is critically important for government "to have a baseline understanding of the dynamic nature of the oil and gas supply chains...; improved situational awareness about the status of oil and gas infrastructure and service interruptions from industry would enable... government agencies to more effectively respond...; [and that a] major challenge during emergency response is effective communication between and within federal and state agencies and with industry."<sup>86</sup> However, the study's recommendations for how to enhance situational awareness focus on improving information sharing by industry on a voluntary basis at both the federal and state levels.

In December 2015—a year after the NPC's report was issued—supporters of the NPC recommendations included a provision in the Fix America's Surface Transportation Act, Public Law No. 114-94 (FAST Act), which directs DOE to promulgate regulations to implement seven actions that essentially mirror

the NPC's primary recommendations. It also requests DOE to provide a report to Congress by June 4, 2016, regarding the effectiveness of the activities authorized by the Act. No funding was provided in the FAST Act to support implementation of these actions.<sup>87</sup>

In authorizing implementation of the NPC recommendations, Congress found that "recent natural disasters have underscored the importance of having resilient oil and natural gas infrastructure and effective ways for industry and government to address energy supply disruptions."<sup>88</sup> But, like the NPC, Congress authorized reliance on voluntary—not mandatory—information sharing between industry and the public sector in addressing fuel emergencies.

On the other hand, the FAST Act's requirement for the DOE Secretary to provide a report to Congress in 180 days<sup>89</sup> does provide an opportunity for DOE to highlight the importance of identifying and obtaining real-time, authoritative access to critical information, and the effectiveness of the NPC approach to meeting this core need.

### **NPC Federal-Level Recommendations: Industry Liaisons, Contact Lists, and Leveraging EIA**

The NPC recommended that DOE organize its energy response team along the lines of the Incident Command System (ICS) incorporated into the National Incident Management System developed by DHS.<sup>90</sup> In this context, the NPC recommended that each of its member companies designate a company liaison officer to establish direct communications with the DOE energy response team to facilitate information sharing, including "extend[ing] communication channels to involve DOE Situation Unit members and company-specific supply chain experts."<sup>91</sup>

The NPC reported that the Oil and Natural Gas Sector Coordinating Council—an advisory body to DHS under the Critical Infrastructure Protection Program comprised of representatives of oil and natural gas industry trade associations—would alter its charter to

assist and support DOE and states in implementation of the NPC recommendations.<sup>92</sup>

Recognizing that the Secretary of Energy may want to confer with leaders of the impacted energy sectors either individually or as a group during emergencies, the NPC undertakes to have its members create and update an emergency leadership contact list of top company officials with decision-making authority during such crises.<sup>93</sup>

Concurrently, NPC recommends that subject matter experts from EIA be embedded within the DOE response team to gather and contextualize information shared by the industry liaisons, and that EIA's support "should be formalized and training on emergency response protocols should be provided to involved EIA personnel."<sup>94</sup>

#### **NPC State-Level Recommendations**

The NPC recognized the critical role of states in gathering and sharing information on the ground and performing response actions to address fuel disruptions. Specifically it recommends information flow from state and local sources to DOE to follow the Incident Command System structure, which relies on "bottom-up communications, reinforcing the communications between local, state, and federal ICS structures."<sup>95</sup>

The NPC also recommends states work with the oil and gas industry on energy assurance planning and that they conduct joint planning sessions and exercises regularly with industry. The NPC also urged industry members to assist states with those efforts, including identifying formal points of contact for industry.<sup>96</sup> It also suggests that joint state–industry efforts should include assessments of the vulnerabilities of supply chains and address dependencies and interdependencies at a local, cross-regional, and cross-industry level, and verification of plans for "fuel supply and distribution points for first responders."<sup>97</sup>

Since Sandy, DOE has continued to work with NASEO, which manages the energy assurance program (EAP), to strengthen relationships and information sharing at the state level and between DOE and states. NASEO has reached out to industry associations, including API, to discuss what increased industry engagement in state energy emergency planning should involve.<sup>98</sup>

DOE intends to implement the NPC recommendations to increase states' engagement with industry, primarily through providing financial assistance for state EAPs. The need for enhancing EAP activities, including funding, was echoed in the 2015 Quadrennial Energy Review.<sup>99</sup> However, DOE's 2015 and 2016 budget requests for funding updated energy assurance planning by states (\$35 million and \$63 million, respectively) received little support from key stakeholders and were rejected each year by Congress.<sup>100</sup>

DOE proposed a new state energy assurance program in its FY 2017 budget request aimed at improving state and local officials' capabilities to "identify the potential for energy disruptions, quantify the impacts of those disruptions, and develop comprehensive plans responding to those disruptions and mitigating the impacts of future disruptions."<sup>101</sup> Specifically DOE proposes a three-year, \$15 million competitive regional cooperative assistance program that would fund about ten awards to teams of local, state, and regional entities that reflect a mix of states and regions that consume and produce energy. Key objectives are to identify critical gaps and integrate evolving risks and regional interdependencies to improve energy emergency preparedness and response.<sup>102</sup>

#### **Additional NPC Recommendations: Business Continuity and Emergency Response Plans**

As noted earlier, energy companies generally maintain business continuity and emergency response plans for natural and man-made disasters. However, these are usually not shared with the public sector except when required, such as spill response plans to address environmental risks from petroleum spills.<sup>103</sup>

The NPC notes the importance of business continuity and emergency response planning in the industry's capacity to address and recover from fuel supply disruptions.<sup>104</sup> It recommends that business continuity plans address interdependencies in the fuel supply chain and incorporate knowledge gained from the state energy assurance planning process into those plans.<sup>105</sup> However, the NPC did not recommend providing access to DOE and/or other public sector decision-makers to the specific fuel emergency response plans of site owners in threatened and impacted areas prior to and during emergencies.

### Gaps in NPC Recommendations

The NPC report and recommendations represent an important step by DOE and industry to facilitate the information sharing process for fuels emergencies at the federal level, but there are some remaining gaps or issues which, based on the experiences of Sandy, could be addressed, including

- information sharing by industry is voluntary; ultimate control over the nature and extent of information provided to the public sector resides with industry;
- there is no requirement to predetermine and formalize the type and form of information that would be provided by industry and how that information is provided (e.g., through a secure electronic portal);
- it is unclear whether NPC supports the sharing by DOE of real-time facility- or company-specific information obtained with other DOE personnel, other federal agencies, or state and local officials, (as opposed to having DOE only aggregate the data and provide “high-level” analyses);<sup>106</sup>
- there is no provision for DOE access to private sector business continuity and emergency response plans;
- the effort to “leverage EIA’s subject matter expertise” is not a sustainable answer to securing the real-time, company- and facility-specific information needed to address fuel emergencies. As recommended here, DOE (including EIA) should clarify and exercise its existing mandatory authority or secure new authority to gather and share the information necessary to address fuel emergencies and permanently integrate this function into its emergency response organization.<sup>107</sup>
- NPC’s commitment to designate industry liaisons only applies to the 108 oil and gas companies that make up its membership.<sup>108</sup> In light of the increasing fragmentation of the industry, especially downstream, this likely omits most retail gas stations and a significant number of independent terminal owners and distributors that are difficult to track.

- There is no recommendation or commitment as to how to secure necessary funding and technical resources for DOE and states to implement the NPC’s recommendations.

### DOE Efforts to Implement the NPC Recommendations and Other Initiatives

#### *NPC Recommendations*

Since December 2014, DOE has implemented NPC recommendations regarding the structure of its emergency management function, including to create an Energy Response Organization (ERO) to align with the Incident Command System, and to include EIA personnel as needed as part of the Oil and Natural Gas Team under the ERO.<sup>109</sup> The ERO is not a permanent body; it is staffed with employees from various parts of DOE as each emergency incident requires. It replaced the DOE energy response team created in 2013, which also was not a full-time group and included “multiple DOE offices, key interagency stakeholders, and private industry representing electricity, oil, and natural gas to assist in situational awareness” during energy emergencies.<sup>110</sup> The DOE’s Infrastructure Security and Energy Restoration (ISER) section is working with EIA to identify model information requests to expedite industry responses. EIA will conduct all outreach to industry for the ERO regarding the collection of information from industry.<sup>111</sup>

Implementation of some other NPC recommendations has been delayed for a few reasons: all NPC member industry liaisons with DOE have not yet been formally designated; funding for state EAPs has not been approved; and a DOE plan to conduct a federal, state, and industry joint exercise in 2015 to test various NPC recommendations has been deferred until 2016.<sup>112</sup> Implementation may be accelerated as a result of DOE’s obligation under the FAST Act discussed earlier to promulgate regulations by June 30, 2016, to address the NPC recommendations, although no funding has been provided to assist this effort.

#### **Other DOE Initiatives**

In FY 2015 and FY 2016, DOE proposed programs and funding (1) to expand ISER’s capability to monitor, receive, analyze, and share real-time information regarding critical energy infrastructure; (2) to create a

permanent Energy Response and Operations Center (EROC) with state-of-the-art technology support at its headquarters in Washington DC to assist in performing its function as the lead federal agency for emergency preparedness and response for the energy sector and serve as a hub for federal energy emergency activities; and (3) to place permanent regional response staff in each FEMA regional office to provide on-the-ground expertise to facilitate identification of and access to information as to critical infrastructure, coordinated regional response, and enhancement of regional resilience.<sup>113</sup> However, these proposals were rejected by Congress, in part regarding the EROC, because of apparent uncertainty as to where to house it in DOE.<sup>114</sup>

In its FY 2017 Congressional budget request, DOE included initiatives to support its role as lead federal agency for energy sector emergency preparedness and response. For example, DOE proposes to do the following:<sup>115</sup>

- Increase ISER’s role in conducting energy emergency exercises at the national and regional levels with private and public sector stakeholders;
- Enhance training for state and local emergency responders;
- Facilitate communications between federal and state officials as to critical information and resource needs; and
- Improve the capacity of states and localities to identify, address, and mitigate energy disruptions, including increased focus on regional interdependencies, communication, and cooperation.

ISER also continues to seek improvements to its energy sector situational awareness capability. Specifically, it proposes to expand the reach of its EAGLE-I GIS-based system for monitoring and mapping power outages at the distribution level at fifteen-minute intervals.<sup>116</sup> Currently the EAGLE-I system focuses on the power sector and relies on a limited number of information sources that restrict access to certain federal officials as well as how the information is used. In its FY 2017 budget request, DOE proposes to expand the EAGLE-I system beyond the power sector

to include gathering and mapping (visualization) of real-time data as to the operational status of all critical energy infrastructure, including the impact of power outages on specific facilities in the fuel supply system; add the capacity to model potential impacts of a variety of hazards on critical facilities to guide evaluation of response measures; and expand the sources of real-time data, such as having the national laboratories collect the data instead of relying on private sources which often impose limitations on the use of data they provide<sup>117</sup>

The prime objectives of this initiative are to enable DOE to identify in close to real time the status of critical energy infrastructure (including pending hazards) and response options and establish two-way electronic communication between DOE and state energy emergency managers, as well as key impacted industry stakeholders, on actionable information needed for energy emergency response; and to serve as a hub for sharing key energy sector data with all segments of the federal response team.<sup>118</sup>

In terms of the EROC, the DOE’s budget request for FY 2017 includes a general provision authorizing preliminary engineering and design of a Consolidated Emergency Operations Center (CEOC). DOE has sufficient funds to pay for the cost of this work and thus did not request new appropriations.<sup>119</sup> The CEOC will combine DOE’s five emergency management functions (personnel, buildings security, intelligence, National Nuclear Security Administration, and energy response) in one shared space with state-of-the-art technology and be staffed 24/7 by full-time employees.<sup>120</sup>

Later in 2016, EIA intends to commence public posting of hourly updates of power demand on 65 power balancing authorities, including the New York Independent System Operator (which operates wholesale markets in New York State) and the PJM (the regional transmission organization that coordinates wholesale electricity markets in thirteen states including New Jersey and Pennsylvania) that manages the electric grid in the lower forty-eight states. According to EIA, this will give it the ability to pinpoint immediately where power supply has been reduced and by how much, and pass this information on to policymakers.<sup>121</sup> EIA also intends to revamp its petroleum data and analysis to



provide more granular regional data below the PADD levels it has used in the past, as well as additional analyses of regional refinery and product markets.<sup>122</sup>

### **United States Department of Homeland Security**

In 2009, the Department of Homeland Security (DHS) began the Regional Resiliency Assessment Program (RRAP) to assess the vulnerability of selected critical infrastructure to significant hazards. It is designed to identify security and resilience gaps, dependencies and interdependencies for critical infrastructure, and capability gaps at the state and local level.<sup>123</sup> Outputs include detailed maps and schematics identifying infrastructure, interdependencies, and distribution channels, and narrative discussion on potential resiliency enhancements. Following delivery of the outputs, DHS and stakeholders are to engage in an implementation phase to examine potential corrective actions.

The RRAP program is voluntary. Currently there are no requirements at the federal level or in New York or New Jersey for owners or operators of critical fuel supply chain infrastructure to conduct vulnerability assessments for natural or man-made disasters, including identification of options for enhancing their resiliency, adopt best practices, and/or to develop and implement other actions to enhance infrastructure resilience.<sup>124</sup>

DHS's primary partners (clients) for RRAPs are generally state and local emergency management agencies, which apply voluntarily to DHS to have an RRAP conducted.<sup>125</sup> Participation by industry is critical to the success of these assessments but is also voluntary.<sup>126</sup> The outputs are usually shared only with the primary partners that requested the RRAP and industry members who participated. However, DHS encourages them to share the information with other public sector officials who are responsible for emergency management, subject to appropriate protections.<sup>127</sup>

Since Sandy DHS has increased its focus on the petroleum sector, particularly along the Gulf and East coasts, and also on the risks of extreme weather and other natural disasters. For example, DHS has recently completed RRAPs examining (1) the product pipeline network (mainly the Colonial Pipeline system running from Houston to Linden, New Jersey) serving the Mid-Atlantic and Northeast states; (2) New Jersey's petroleum

sector; and (3) refineries in Pennsylvania. DHS has also approved an RRAP to examine the petroleum sector in New York State, including review of the New York City metropolitan area and interdependencies with New Jersey.<sup>128</sup>

### **State and Local Initiatives: New York State, New Jersey, New York City**

Since Sandy, New York City, New York State, and New Jersey have undertaken various initiatives to strengthen their relationships with critical infrastructure owners and operators; improve their understanding of the fuel supply chain, industry, and market operations; and prioritize the restoration of power to critical fuel assets by utilities. Select initiatives are described below.

#### **New York State**

Immediately following Sandy, Governor Cuomo established several commissions to examine the challenges presented by the storm and provide recommendations for short- and long-term steps to enhance the state's emergency planning and response capabilities. The principal report was issued by NYS 2100 Commission, which among other things noted the need for additional regional focus and cooperation, in particular where critical infrastructure systems cross state boundaries.<sup>129</sup> Specific actions taken include the following:<sup>130</sup>

- The establishment of state gasoline reserves on Long Island (2.5 million gallons) and in Upstate New York (2.5 million gallons) across six locations.<sup>131</sup>
- The creation and implementation of the NYS Fuel NY Gas Station Power Backup Program, which mandates emergency backup power generation or the capability to connect to a portable generator for strategic gas stations in New York City, Nassau, Suffolk, Westchester, and Rockland Counties.<sup>132</sup> Approximately 1,000 of these stations have been designated as "strategic" or "strategic buffer gas stations" as they serve critical routes. This program provides a significant opportunity to establish a system for tracking the operational status, supplies, and response plans of strategic stations during declared energy or fuel supply emergencies.<sup>134</sup>
- The assessment of the resilience of petroleum

storage terminals in New York State conducted by the New York State Energy Research and Development Authority (NYSERDA), which noted among other items that several terminal operators have adopted plans to provide onsite backup power generation of varying capacities.<sup>135</sup>

- The development of a comprehensive list of key regulations likely to require waivers to move fuel as well as related information requirements and draft waiver packages during emergencies.
- The requirement for state-regulated electric utilities to restore power to critical fuel supply infrastructure on a priority basis established by the Public Service Commission (PSC) as part of their emergency response plans required to be filed annually with the PSC.<sup>136</sup> Utilities are also required by the PSC to provide a critical facilities list and develop outreach plans to critical fuel sector customers; provide electronic outage data to the PSC every half hour; provide critical facility status information to the state during widespread events; provide restoration information to critical facilities; and conduct drills to practice emergency management plans (although not necessarily with specific critical customers).<sup>137</sup>
- The development of initiatives by state-regulated utilities with PSC approval to enhance the resiliency of their transmission and distribution systems for extreme weather events, including critical substations.<sup>138</sup>

In summer 2015, New York State in coordination with New York City applied to DHS for a voluntary RRAP of the liquid fuels supply chain, related power supply systems, and key vulnerabilities. The application was approved, and the three-year RRAP process has recently commenced. It is designed to enhance understanding of the fuel supply chain in New York State, including regional interdependencies with New Jersey, and to complement a similar RRAP completed in 2015 with respect to New Jersey's petroleum sector.<sup>139</sup>

### New Jersey

New Jersey hosts a variety of fuel infrastructure and operations that are critical to the New York Tri-state region, including multiple refiners in North and South

New Jersey, major pipelines, storage, distribution, and marine operations. As noted, New Jersey (prior to and during Sandy) supplements voluntary communications with industry during emergencies with a variety of additional voluntary structures. Specific actions taken since Sandy include the following:

- The creation of a database ("petroleum tool kit") by the Department of Environmental Protection (DEP), which is supported by GIS maps of key facilities and contacts in New Jersey across the fuel supply chain, as well as a summary of relevant regulatory waivers and related information requirements.
- The completion of a DHS-sponsored RRAP project in the spring of 2015, which mapped out key petroleum infrastructure and power sector interdependencies in New Jersey.
- The enactment of the New Jersey Retail Fuel Station Program, a voluntary program to provide financial assistance to retail gas stations on critical routes for installation of emergency generator or connection systems.<sup>140</sup>
- The updating of New Jersey's 2011 Energy Master Plan in December 2015 by the New Jersey Board of Public Utilities (BPU) and the DEP to include a new section with goals and recommendations to improve resiliency of energy infrastructure along with emergency preparedness and response capabilities.<sup>141</sup>
- The identification of critical fuel supply chain assets by state-regulated electric utilities. Utilities put these assets on their priority restoration customer lists and developed initiatives to enhance the resiliency of their transmission and distribution systems (including critical substations) against extreme weather events.<sup>142</sup>

### New York City

During Sandy, New York City relied heavily on trusted relationships with industry and other government officials to gather what information it could pertaining to the liquid fuels supply chain and markets. Immediately following Sandy, New York City prepared an after-action report that highlighted many of the situational

awareness challenges experienced with respect to the fuel shortage.<sup>143</sup> Six months later, the city completed its report, “A Stronger, More Resilient New York,” which formalized and expanded upon the initial analysis and recommendations discussed in the NYC AAR. This report featured a specific chapter and several actionable recommendations targeting the resilience of the liquid fuels supply chain.<sup>144</sup> Since Superstorm Sandy, actions taken have included the following:

- The development of a Citywide Emergency Fuel Operations Plan for the distribution of fuel for its emergency fleet and operations, led by NYC Emergency Management, NYC Department of Citywide Administrative Services, with the support of the NYC Police Department. The plan includes identification of and establishment of contacts with key fuel suppliers and contacts with key public sector agencies.
- The establishment of a NYC Emergency Fuels Task Force which includes public and private sector partners in the NY Tri-state region and meets quarterly to review emergency fueling initiatives, improve coordination of emergency fueling operations, and update related plans and protocols.
- The doubling of the city’s internal mobile fuel truck resources and roll-out of a new fuel management system to enable better sharing, reporting, and coordination of the city government’s internal fueling infrastructure.
- Working with Columbia University’s Center on Global Energy Policy to convene multiple stakeholder workshops to enhance fuel supply chain resilience.
- Reconvening the NYC Climate Change Adaptation Task Force in July 2015 through the Mayor’s Office of Recovery and Resiliency (ORR).<sup>145</sup> The task force features participation from key owners and operators of critical infrastructure assets and systems, including the fuel and power and telecommunications sectors. The objective is to better understand climate and extreme weather impacts and to work with public and private stakeholders to formulate and update coordinated

strategies to address the potential impacts of climate change on city systems and infrastructure. New York City conducts risk assessments of critical public and private infrastructure and identifies adaptation strategies through its Climate Change Adaptation Task Force.<sup>146</sup>

- Developing and piloting the FuelingNYC platform to facilitate supply chain mapping and streamline communications between the oil and gas industry and public sector agencies, led by the NYC Economic Development Corporation (NYCEDC).<sup>147</sup>

### Regional Coordination Initiatives

Given the interstate nature of fuel supply infrastructure, the National Association of State Energy Officials (NASEO) has long been a proponent of regional multistate exercises. The NPC also recommends that states, industry, and DOE conduct joint planning and exercises together to enable industry to improve state and local government knowledge of the supply chain and help improve companies’ business continuity and emergency response plans<sup>148</sup>

To facilitate regional coordination as well as coordination between states and DOE—NASEO, DOE, the National Association of Utility Commissioners (NARUC), National Governor’s Association (NGA), and National Emergency Management Association (NEMA)<sup>149</sup> entered into an Agreement for Enhanced Federal and State Energy Emergency Coordination, Communications, and Information Sharing on February 10, 2016 (FS MOU). The FS MOU provides in part that states would give timely assessments of energy markets in the event of a supply disruption to surrounding states and DOE (via restricted website, e-mail lists, and conference calls)<sup>150</sup>

## RECOMMENDATIONS

As discussed previously, situational awareness was identified during the forums convened by CGEP as a priority issue. It lies at the core of effective preparedness for and response to fuel emergencies, including priority matters such as providing timely regulatory relief, supplying fuel to first responders and other critical customers, and the successful implementation of many other advances in fuel sector resiliency since Sandy. Enhancing situational awareness is a key goal of the National Infrastructure Protection Plan.<sup>151</sup>

As noted earlier, since Sandy there have been efforts to improve public sector understanding of the fuel supply system as well as to enhance voluntary engagement, including identification of responsible contacts between the public and private sectors. However, these efforts are not sufficient to maximize effective response to fuel emergencies.

To bolster and improve upon these efforts, this report recommends creating mandatory reporting requirements to address fuel emergencies. The proposed mandatory reporting of baseline and real-time information for critical fuels infrastructure and related markets by the private sector involves straightforward collection of information readily available to and expected to be generated by industry during a fuel emergency regardless of reporting requirements.

Private sector concerns regarding disclosure of proprietary information can be and have been addressed in existing state<sup>152</sup> and federal<sup>153</sup> legislation for information collection purposes by including express nondisclosure provisions subject to significant penalties in authorizing legislation, regulations, and protocols. Risk of potential antitrust issues is minimized if not eliminated by requiring entities to report separately to regulators and by not permitting sharing of company-specific data with other reporting entities.<sup>154</sup> According to the NPC, “the antitrust laws do not prevent a company from providing competitively sensitive information directly, and in confidence, to responsible government officials so that adequate information is available about supply conditions.”<sup>155</sup>

In addition, it is clear that the market plays an important role in addressing and responding to fuel emergencies. The NPC report states the market is

usually the most efficient mechanism to respond to supply disruptions, and “industry participants often cooperate to resolve supply disruptions through legal, arms-length arrangements such as bilateral product sales and swaps and development of technical standards that ease interoperability.”<sup>156</sup> Several private sector stakeholders reported during the CGEP forums that during Superstorm Sandy, they had sufficient information about market and supply conditions to engage in workarounds to allocate available supplies where needed without interfering with contractual obligations, and that this worked well.<sup>157</sup>

As noted earlier, some industry representatives have also expressed concern that information provided to the government regarding fuel supplies and market conditions could be used to implement additional regulations that would adversely impact their competitive position or require uneconomic actions, such as maintaining excessive inventories.

Public officials have an obligation to protect public health and welfare and to limit socioeconomic loss to the extent possible. While there is respect for the market and recognition of the need to understand how it operates, public officials must be prepared to act in case of market failure and take appropriate action to fulfill social objectives in the context of a fuel disruption or other emergency. To do so, government officials must be able to monitor and assess market options to inform and justify decisions made during emergency response and communicate accurate, credible information to the public.

No one wants available market solutions to be unduly impeded by excessive demands for information, unnecessary regulations, or premature interventions. Public officials should have clear, reasonable justifications for information requests to industry and response measures.

Moreover, the risk of undue interference with the market from unnecessary regulations or counterproductive action by the public sector can be minimized through continuing education of and engagement with the public sector about market options and timely sharing of information regarding planned actions by industry. These efforts will facilitate coordination of public



and private actions, and deference to the market by public officials when market solutions are available and address common objectives. Sharpening the government's understanding of market conditions and operational status—as well as restoration plans for key infrastructure—is necessary to maximize effectiveness of response and coordination of public and private resources and action during emergencies.

Detailed recommendations are set forth below. They focus on the liquid fuels supply chain serving the New York Tri-state area. However, they can serve as a model for other regions in and outside of the United States. Critically, we find that the keys to implementing these steps are committed and sustained leadership among senior-level stakeholders in the public and private sector, and the allocation of sufficient funding and other resources at the federal and state levels.<sup>158</sup>

In summary, we recommend this:

- (1) Identify and prioritize critical fuel supply chain infrastructure and related power supply and other interdependencies, fuel suppliers and distribution channels, and related industry and government contacts for the region.**<sup>159</sup>

The liquid fuels supply chain is complex and the fuel market is incredibly dynamic. To address fuel emergencies, it is necessary to first identify and focus on the critical facilities and nodes (interdependencies) in the supply chain and prioritize among them in terms of their relative contribution to regional fuel supplies. To do this effectively requires extensive engagement by public officials with the private sector and close coordination by energy officials with emergency management officials.

Considerable progress has been made in this area. For example, as earlier noted,

- NYSERDA has conducted a resiliency assessment of petroleum storage terminals in New York;
- New Jersey has obtained an RRAP focused on upstream petroleum infrastructure in the state;
- New York State and New York City have commenced an RRAP under the direction of DHS focused on upstream petroleum infrastructure in New York and interdependencies with New Jersey;

- New York City has reconvened its Climate Change Adaptation Task Force including key fuel (as well as power sector) stakeholders; completed a Citywide Emergency Fuel Operations Plan; and set up an Emergency Fuels Task Force with public and private sector members;
- New York and New Jersey have identified strategic gas stations;
- New York City has developed a fuel supply chain map and a related list of petroleum terminal contacts;
- electric utilities in New York have developed lists of critical petroleum infrastructure entitled to priority restoration of service, and New Jersey's electric utilities have taken similar steps.;
- EIA has identified primary petroleum sector infrastructure, created state energy profiles (including energy infrastructure maps for New York and New Jersey), and commenced a series of studies of transportation fuel markets designed in part to identify critical infrastructure in regional fuel supply chains at both the PADD and sub-PADD levels;<sup>160</sup>
- ISER has developed EAGLE-I for power facilities and maps of certain energy infrastructure;
- DHS had conducted RRAPs of various energy infrastructure, including the Colonial Pipeline system that delivers petroleum products from the Gulf Coast to New Jersey and petroleum refineries in Pennsylvania.

Continuous improvements in identifying critical infrastructure should include regularly updated, user-friendly lists and maps, as well as systems for tracking transport and distribution of critical supplies. Maps and lists should reflect an operationally useful level of detail depicting critical infrastructure, distribution channels, and interdependencies.<sup>161</sup> Include the following items:

#### **Maps:**

- Refineries, terminals, pipelines, marine facilities, and gas stations that supply and distribute to a defined region, including capacities and average annual throughputs for refineries, pipelines, and terminals;

- Related power infrastructure, including key substations serving critical infrastructure; and
- Marine facilities and transport routes, including schematics and maps for New York Harbor and related waterways such as Arthur Kill and Kill Van Kull.

#### Lists/Contacts/Tracking Systems:

- Owners, operators, and senior-level contacts for refineries, terminals, pipelines, marine facilities, and gas stations, and related trade associations, in particular those that can aggregate retailers and distributors;
- Marine tanker and barge owners and shippers with knowledge of transport routes and control over the distribution of the products shipped, including a system to track tankers and barges;<sup>162</sup>
- Customers of critical terminals and pipelines who own or have control over the storage and transportation of products;
- Wholesale distributors and resellers with knowledge of the flow of product and operational status of their key retail customers, including a system to track the flow of supplies; and
- Primary power suppliers and related infrastructure (e.g., substations) serving critical components of the fuel supply chain, and utility personnel responsible for power restoration to the fuel sector.

#### Industry and Government Contacts:

- Federal, state, and local agencies—with industry cooperation—should identify primary liaisons with the private sector with relevant expertise and authority as well as responsibility for engagement and communications with industry;
- Government officials should establish and provide specific points of contact with relevant authority and expertise for industry as well as communicate to industry their roles and responsibilities.<sup>163</sup>

The increasing fragmentation of the fuel industry has exacerbated the difficulty of tracking product flows and identifying key wholesalers, distributors, retail owners, and operators across the region.<sup>164</sup> As New York City observed after Sandy, the nature of the fuels industry

“[i]n particular, the large number of industry

participants and stakeholders, the competitive nature of the fuels industry and relatively lax regulations, limited the city’s situational awareness of what caused long lines at the gas pumps and how to find a solution for City operations and private citizens.”<sup>165</sup>

One option is for public officials to work through industry and trade associations to help aggregate retail outlets and provide a knowledgeable, centralized point of contact. For example, API is working with the Petroleum Marketers Association to supplement its Oil and Natural Gas Industry Emergency Preparedness Handbook to examine petroleum marketing and, in particular, how products are distributed from terminals to the retail outlets.<sup>166</sup>

Development of distribution plans by DOE for the Northeast Gasoline Supply Reserve, and by NYSEERDA for the New York State Refined Product Reserve, afford opportunities to identify primary distributors serving the New York Tri-state area. NYSEERDA is reaching out to industry to establish pre-emergency links with distributors likely to bid at reserve auctions.<sup>167</sup>

For retail gasoline stations, we recommend that New York and New Jersey each establish a system for tracking the real-time operational status and response plans of strategic stations during declared energy or fuel supply emergencies. New York’s Fuel NY program provides an excellent vehicle for this purpose. New York now has a list of contacts for and requires certain reporting by owners and operators of strategic gas stations, and thereby has the means to expand monitoring of their activities to include operational status and inventories prior to and during emergencies. New Jersey has identified critical distributors and stations as well and is in a similar position to utilize this information to track capabilities at stations during emergencies.<sup>168</sup> New York City has identified the fuel distributors that supply its emergency fleet and appears to be in a position to track their real-time operational status during emergencies.<sup>169</sup>

**(2) Identify critical baseline (ordinary course of business) and real-time<sup>170</sup> (capacity under emergency conditions) information for critical infrastructure essential for effective fuel emergency preparedness and response by the public sector.<sup>171</sup>**

Baseline and real-time information focused on the fuels sector is essential for effective emergency preparedness and response.<sup>172</sup>

Substantial baseline information regarding the petroleum sector is collected on a mandatory basis by EIA in the ordinary course of business. Such data is not, however, gathered or analyzed specifically for emergency preparedness or response purposes, or provided to states or other federal agencies on a company- or facility-specific basis.<sup>173</sup>

Following Sandy, DOE highlighted the critical need for real-time information and recommended developing “real-time monitoring of fuel availability and storage levels at all points of the pipeline from well to wheel.” DOE concluded that such information should be communicated to decision-makers as well as consumers, adding that “the Federal government can work with the private sector to design technologies that measure and report accurate, real-time information.”<sup>174</sup>

In a similar vein after Sandy, New York City concluded: “a lack of available information on the operational status of terminals, pipelines, refineries and other key infrastructure *delayed situational awareness for several days.*”<sup>175</sup>

Both EIA and the DOE’s Office of Electricity Delivery and Energy Reliability (OE) have taken steps to collect real-time information to address energy emergencies. In March 2014, EIA commenced requiring the reporting of hourly net generation of electricity by approximately sixty-five entities responsible for balancing supply and demand on the bulk power grid.<sup>176</sup> According to EIA, the purpose of collecting and sharing current data on net power generation by these entities is to assist public policymakers in the performance of their duties, including “to provide near real-time information on the recovery of the power system in the wake of system upsets (e.g., hurricane damage, wide-area blackouts).”<sup>177</sup>

In July 2014, EIA secured OMB approval for a standby form<sup>178</sup> for use to collect information to track coal stocks, receipts, and consumption of electric utilities during coal supply emergencies.<sup>179</sup>

In addition to using EAGLE-I, OE can require industry to report data to address emergencies. For example, it has issued a form<sup>180</sup> to obtain “current information regarding emergency situations on US electric energy supply systems” to help the DOE to respond quickly to energy emergencies that could hurt infrastructure.<sup>181</sup>

Real-time information regarding power supplies can assist in evaluating the status of critical fuel infrastructure given its reliance on grid-based power to operate. However, it cannot substitute for detailed information on that infrastructure itself, such as the operational status, potential causes of disruptions, restoration times for specific facilities, or the availability of fuel supplies, deliveries, and fuel flows, or site-specific options for response.<sup>182</sup>

As noted earlier, DOE unsuccessfully proposed in FY 2015 and FY 2016, and has offered a revised program in FY 2017, to enhance its ability to provide situational awareness by developing the capacity of the Infrastructure Security and Energy Restoration section to monitor, receive, share, and visualize real-time information on threats to, and the status and capacity to respond to disruptions of, critical energy infrastructure.

To identify relevant information, public officials should consult among themselves as well as with industry and examine past emergencies to determine information required to make the most common set of response decisions. Some of this work has been done and the results released in post-Sandy reports by DOE and New York City mentioned earlier.<sup>183</sup>

Further work needs to be done in identifying what real-time and other information is generated by owners and operators of critical fuel supply infrastructure (and other private sector sources)<sup>184</sup> in the ordinary course of business and for emergency purposes regarding operational status, supply chains, customer needs, and response options. More information is needed concerning available technologies (such as sensors for gathering real-time data) for gathering and sharing this data, as well as forecasting the arrival and potential impacts of extreme weather and other disruptive events. These efforts should greatly assist stakeholders in assessing the feasibility and potential burdens of providing critical information.<sup>185</sup>

Based on the forums convened by CGEP, subsequent conversations with stakeholders, and research, the following is the critical but currently unavailable information needed to address fuel emergencies:

- Operational status of key assets (including related power supply infrastructure) and estimated time and plan to correct any damage and restore operations, including grid and onsite power;

- Pipeline and terminal throughput by volume and product type over specified time periods, such as every twelve or twenty-four hours for real time, and over twenty-four hours on an average basis quarterly for baseline to cover seasonal and usage changes in fuel;<sup>186</sup>
- Volumes of products delivered to terminals by barge and tanker over a 24-hour period on a quarterly average basis as baseline, and daily during emergencies;
- Inventories at terminals, including allocation and end destination of product; and persons knowledgeable on these topics, such as owners of fuel stored in terminals and fuel distributors with knowledge of and control over how it is allocated and the operational status of their customers;
- Status and availability of fuel at retail locations in each jurisdiction;
- Expected delivery schedules by product type for specified periods (e.g., three days, five days, nine days)<sup>187</sup> and sources (e.g., tanker, barge shipments, and shippers responsible for the vessels; cargo owners and persons knowledgeable about the status of shipping routes and delivery schedules with control over the cargo);
- Capacity of terminals to receive fuel and to deliver fuel, including status of truck loading racks and delivery routes, onsite electrical equipment, control rooms and staffing, marine unloading equipment, and anticipated restoration times for critical operations;
- Status of key waterways and related marine facilities, as well as status and tracking of major tankers and barges.

**(3) DOE—preferably through EIA—should establish requirements for industry to report critical baseline and real-time information (as outlined above) on a facility- and company-specific basis, and should share it with relevant federal and state officials; and as necessary, state energy authorities should do the same, in each case with appropriate protections for proprietary information and consultation with industry regarding identification and utility of critical information.**

**Federal level: Extend EIA’s existing authority to mandate reporting by the petroleum sector to include predefined critical baseline and real-time information to address fuel emergencies.**

Leveraging EIA’s expertise in and authority for mandatory data collection provides the most efficient and practical means for ensuring collection of the targeted (i.e., facility- and company-specific) and real-time information required to address fuel emergencies.

However, as discussed earlier, EIA’s standard information collection process of using surveys as well as having to obtain OMB approval under the PWRA is not designed or well suited for addressing fuel emergencies.<sup>188</sup>

As a first step toward improving its ability to function effectively during crises, EIA should promptly develop and secure OMB approval for information requests to address fuel emergencies and seek necessary funding to cover additional technical, staff, and other resources required for this purpose.<sup>189</sup>

At the same time, EIA should extend or, if necessary, seek additional mandatory collection authority and develop processes to obtain critical baseline and real-time information to address fuel emergencies. In addition, EIA must be able to share facility- and company-specific data on a real-time basis. Data sharing is essential to provide a credible basis to implement response plans and to maximize the efficiency of the EIA reporting regime, including minimizing additional state reporting requirements for data not available from EIA. Information should be shared with

- other parts of DOE engaged in emergency preparedness and response, such as ISER and the Office of Petroleum Reserves;<sup>190</sup>
- other relevant federal agencies<sup>191</sup> (e.g., FEMA, DOT, EPA as requested for response measures); and
- relevant state and local officials (via a secure electronic portal) who need granular, actionable data to evaluate and pursue available response measures, such as regulatory relief and demand management, in the impacted areas under their jurisdiction.<sup>192</sup>

Alternatively, information collected by EIA could be assembled and shared with other federal and relevant state and local agencies by ISER acting as lead office for DOE energy emergency response.<sup>193</sup>



In developing information requests, EIA should consult and coordinate with:

- ISER, as well as other federal agencies and relevant state and local officials to identify information most useful to them in their emergency preparedness and response activities; and
- Industry, including ONG SCC.<sup>194</sup>

If EIA is unable to meet emergency response needs and secure necessary authority, DOE should exercise its existing authority<sup>195</sup> or seek additional authority independent of EIA to collect and share critical information for addressing fuel emergencies. Such authority is essential for DOE to perform its role as the lead federal agency responsible for coordinating emergency response for the energy sector.

As noted earlier, protections against disclosure of demonstrated proprietary information provided by industry to and shared by DOE are contained in several federal laws. To the extent that these may not be considered sufficient—for example, to address potential security issues or ensure protection under laws of states or localities that need the information—the protections could be broadened and strengthened. In this connection, restrictions on the disclosure of “critical electric infrastructure information” (CEII) contained in the FAST Act could provide a vehicle and/or precedent to address such concerns. Congress exempted CEII from disclosure under the Federal Freedom of Information Act (5 USC Section 552(b)(3)) and comparable state and local laws. It also directed the Federal Energy Regulatory Commission (FERC), after consultation with the Secretary of DOE, to promulgate regulations by December 4, 2016, that set criteria and procedures to designate CEII, prohibit its unauthorized disclosure, provide “appropriate sanctions” for persons at FERC or DOE who “knowingly and willfully” disclose CEII in an unauthorized manner, and facilitate voluntary sharing of CEII by and among relevant federal, state, and local authorities and owners, operators, and users of critical electric infrastructure.<sup>196</sup>

#### **State level:**

States should exercise existing or seek additional authority to require mandatory reporting of information as necessary to supplement information available from other sources, such as DOE/EIA and/or other states needed to plan for and respond to fuel emergencies.<sup>197</sup>

The authority should include the following:

- The right to share such information with other states as well as local and federal officials, subject to appropriate protection for proprietary information; and
- Reporting by critical facilities on the nature and status of power restoration actions by electric utilities for grid-supplied power and status of and restoration plans for onsite electrical systems.

States often need more granular data than their federal partners, as at times they need to inform the public and assess specific response measures, such as fuel rationing and/or options for restoring power to critical terminals. In turn, state officials may have greater access to key private sector stakeholders in impacted areas. Moreover, states play a vital role in providing onsite information to their federal partners as noted by the NPC.

Information needs will necessarily vary from jurisdiction to jurisdiction; for example, emergency managers and responders in the field will often need more granular and different information in a different form than policymakers in Washington, DC, and in state capitols. Moreover, emergencies by definition require flexibility and contingency plans, and can involve disruption of the best of preexisting procedures, including communication networks. Backup information channels and authorities at the state level, together with appropriate protections for proprietary information and use of the market, can provide a reasonable added level of security—particularly in view of the growing number and intensity of threats to critical infrastructure.

At least four states that have experienced fuel disruptions from extreme weather and other natural disasters have enacted laws that grant them express authority to establish mandatory reporting of information regarding fuel availability to aid in emergency response. These include California, Florida, Massachusetts, and Rhode Island.<sup>198</sup> In each case, the legislation expressly precludes public disclosure of facility and company-specific information, but permits aggregates of the information to be treated as public record.<sup>199</sup> In addition, the company-specific information collected is only authorized to be shared among state entities—not with other states. Rhode Island and Florida have prepared formal information protocols for emergency use, which they supplement

as needed by directly contacting owners and operators of critical infrastructure. California is exploring options for establishing a formal and secure system<sup>200</sup>

In New York State, legislation has been introduced this year in the State Senate and Assembly that would require registration and reporting by major petroleum suppliers and pipeline operators in the state to enable authorities to secure essential information regarding available petroleum supplies under normal operations and during energy emergencies. Specifically, it requires these entities to provide and keep current emergency contacts, report annually regarding supplies, deliveries, and backup power capability, and quarterly regarding operational status, inventories, and fuel flows, and at least daily as to these and other matters during energy emergencies—in each case to NYSERDA.<sup>201</sup> Information required to be provided to NYSERDA is exempted from public disclosure but can be shared with “any New York State entity” as needed and subject to the same nondisclosure rule.<sup>202</sup> According to the sponsors of the legislation, the “importance of up-to-date information of this kind, and in particular, real-time updates, has been underscored during times of emergencies in recent years.”<sup>203</sup>

To enhance the capacity of states to plan for emergencies, maintain knowledge of the fuel supply chain and market dynamics, engage with stakeholders, and assess fuel sector emergency response needs, the federal government should fund updated state energy assurance planning (EAP)—as requested from Congress by DOE since FY 2015.

#### **(4) Industry representatives should be included as needed in public sector emergency response operations.**

After Sandy, DOE recommended that representatives of the fuel industry should be embedded in emergency operations centers to improve links between the government and companies.<sup>204</sup>

The NPC has recommended that the Oil and Natural Gas Subsector Coordinating Council (ONG SCC) alter its charter to authorize and increase engagement with DOE to further understanding and situational awareness regarding the fuel supply chain.<sup>205</sup> However, according to the NPC, ONG SCC’s participation would

be subject to significant limitations based on existing antitrust laws, including in terms of sharing company-specific information, market analysis, pricing, inventory stocks, and product movements.<sup>206</sup>

Also the NPC recognized the need for senior energy officials such as the Secretary of Energy and governors to meet with groups of senior executives of critical energy companies during emergencies. While such consultations could raise potential antitrust concerns, the NPC advised that this risk can be minimized by careful attention to subjects discussed, such as by focusing on issues related to returning operations to normal as quickly as possible rather than on coordination among competitors that could be deemed inappropriate.<sup>207</sup>

In addition, there should be a review of antitrust laws and their applicability to any necessary consultations between the private and public sectors to address these concerns. Guidance should be provided as well as changes recommended as needed for effective and reasonable response to fuel emergencies, including appropriate protections for consumers.<sup>208</sup> Such a review should be conducted by DOE, in conjunction with Department of Justice (DOJ) and NASEO, in consultation with the NPC and ONG SCC.

As noted earlier, there are cases where industry and the public sector cooperate during emergencies. New Jersey includes private sector representatives from trade associations on a voluntary basis at a private sector desk in its state emergency operations center to facilitate situational awareness. New York City includes industry representatives on an as-needed basis in its emergency operations center and activities. New York State generally consults relevant industry experts on an as-needed basis during emergencies.<sup>209</sup> Other states including Texas<sup>210</sup> and Louisiana (LA) have set up “fuels teams” comprised of industry and trade association representatives who participate on a voluntary basis to facilitate communication, planning, and coordination of fuel distribution for fuel disruptions, working with state emergency management officials.<sup>211</sup>

At all levels of government, a list of industry representatives with appropriate authority and who will be available to participate during emergencies should be developed and periodically updated.

New York and New Jersey should also maintain a list

of senior executives at entities that own critical fuels infrastructure serving the New York Tri-state area and create a process for them to meet or talk with their respective governors in groups or individually as necessary during fuel emergencies, subject to appropriate guidelines to avoid antitrust concerns.<sup>212</sup>

**(5) Enhance DOE's capability to lead and coordinate public sector situational awareness on a national and regional level.**

As mentioned earlier, ISER, within the DOE's Office of Electricity Delivery and Energy Reliability (OE), has prime responsibility for emergency preparedness and response and infrastructure resiliency. OE has made efforts to establish a permanent Energy Response and Operations Center (EROC) in Washington, DC, that would monitor (and visualize using a state-of-the-art "knowledge wall"), receive, analyze, and share real-time information with other federal agencies, energy sector partners, and federal and state emergency operations centers with respect to critical energy infrastructure.<sup>213</sup>

One option for the EROC reportedly under consideration is to house it at the National Nuclear Security Administration (NNSA), statutorily created in 2000 as a separate agency within DOE, reporting directly to the Secretary.<sup>214</sup> Issues raised by this option included whether NNSA has authority to deal with nonnuclear emergencies, and potential increases in cost owing to security requirements applicable to NNSA operations.<sup>215</sup> NNSA maintains a permanent emergency operations staff to monitor nuclear and radiological emergencies. The Secretary of Energy, in consultation with the Administrator of NNSA and Congress, has the statutory authority to transfer any facility, mission, or function to the NNSA.<sup>216</sup>

Establishment of an EROC as well as enhanced presence in the field are critical to maximizing DOE's capability to lead the federal effort on energy sector emergency preparedness and response. In terms of an operations center, as noted earlier, DOE currently intends to proceed with design of a Consolidated Emergency Operations Center in FY 2017.

Regarding enhanced field operations, no other federal agency, including FEMA or other DHS offices, has the expertise, staffing, or relationships with the energy sector to lead regional efforts on situational awareness and resilience enhancement. Moreover,

other sector-specific agencies, such as the Department of Transportation, have regional offices that play important roles in emergency response.

DOE should aggressively pursue funding and any necessary authorization for enhanced regional operations and for prompt completion of the COCC.

**(6) Clarify responsibility for energy sector emergency preparedness and response at each level of government.**

Timely, efficient communication among local, state, and federal government during fuel emergencies is essential for effective situational awareness, including using information collected and shared to implement response plans, such as regulatory relief, the use of reserves, and demand management efforts.<sup>217</sup> To accomplish this, responsibilities need to be clearly established and key contacts identified—as well as periodically updated—at the federal, state, and local levels. Permanent coordination among relevant agencies across and at each government level is also needed.

While the DOE has already created an Energy Response Organization that can be assembled during emergencies, it should go further and provide the ERO with permanent, full-time staff, and establish clear communications channels between them and their counterparts at state level and other relevant federal agencies.

At the state and local levels, lead agencies—as well as senior contacts and communication channels for addressing fuel emergencies—need to be clearly established and be formally designated responsible for coordinating communications as needed with other relevant state agencies.

Specific parties need to be clearly responsible and accountable for the petroleum sector at the federal, state, and local levels, as recommended by the NPC in its report.<sup>218</sup>

These efforts will require cooperation between energy and emergency management authorities at all government levels, particularly at the federal level between DOE and DHS, given DHS's lead role in coordinating the federal government's overall response to emergencies. To maximize overall public sector effectiveness for energy emergency preparedness and response, a concerted effort should be made to break

down silos and facilitate coordination between energy and emergency management officials at the federal, state, and local levels.

**(7) DOE and lead state energy agencies should establish permanent structures and processes to share and coordinate information and response activities among public officials.**

DOE and the lead energy agencies at the state level should consider establishment of fuels task forces for regions with significant interdependencies, as well as for internal purposes. Task forces should meet periodically, not just during emergencies.<sup>219</sup> In each case, the fuels task force should have a formal charter, powers, and objectives, and sufficient staff and funding to function on a permanent basis. Representatives of industry could be included periodically as needed.<sup>220</sup>

A prime task of the task forces would be to streamline and develop expedited processes for granting regulatory relief during emergencies, including coordination among relevant federal and state agencies, and administration of government-owned refined product reserves.

At the federal level, DOE should assemble relevant agencies such as DHS/FEMA, EPA, and DOT to coordinate expertise and share relevant information for fuel emergencies. States should assemble agencies responsible for fuels monitoring and allocation, policy, markets and distribution, emergency management, power supplies, transportation, and environmental protection.<sup>221</sup>

**(8) Enhance regional public sector understanding of the fuel supply chain, market, and infrastructure, including options for improving critical facility resiliency by conducting regional resiliency assessments of critical energy infrastructure (RRAPs).**

The DHS voluntary RRAP program can help emergency management and energy officials at all levels better understand the fuel supply chain, including critical infrastructure and key interdependencies, and options for improving critical facility resiliency. RRAPs afford an important opportunity to leverage the expertise and capabilities of other federal agencies focused on energy and national security matters, such as DOE, DOT, EPA, and the national laboratories within DOE on behalf of state and local partners.

The RRAP process and its outputs also can facilitate cross-regional understanding and coordination among public and private sector stakeholders through site visits, workshops, and drills.

Outputs should include an evaluation of the vulnerabilities of critical assets to extreme weather, security and other relevant hazards; key interdependencies; response plans for critical infrastructure and identification of options to address identified vulnerabilities, best practices and other potential resiliency improvements. Such options could include the hardening of onsite electrical systems that service pumps at pipelines or terminals, and alternatives to grid-based power. Absent a mandatory program requiring owners and operators of critical fuels infrastructure to conduct risk assessments, including potential resilience enhancements, RRAPs can provide a means to develop similar information that can assist the private and public sectors to address the adequacy of critical energy infrastructure resiliency to a variety of hazards, by developing metrics for resiliency measurements to guide planning as well as evaluate progress, and cataloging best practices with related costs and financing options.<sup>222</sup>

To maximize the utility of RRAPs and given DOE's role as the lead federal agency for the energy sector and its responsibility for the national laboratories often utilized for these assessments, DHS should include DOE as a full partner in the planning, conduct, and implementation of energy sector RRAPs. This should include collaboration in the information collection process as well as the generation of outputs.<sup>223</sup> Increased collaboration with DOE should also be pursued by DHS in conducting energy facility visits and surveys pursuant to the EPIC program.<sup>224</sup> Projects should also involve relevant energy, emergency management, and homeland security officials in state and local governments, as well as facilitate interaction among officials in regions with significant interdependencies, such as New York and New Jersey, and share results of regionally focused RRAPs among impacted jurisdictions.<sup>225</sup>

The pending RRAP for New York State<sup>226</sup> could for example provide a useful opportunity for electric utilities in the New York Tri-state area to collaborate with owners and operators of critical fuel infrastructure on identifying vulnerable facilities and options for enhanced resilience, including reserves of critical electrical equipment, such as transformers,<sup>227</sup> distributed generation, and micro-grids.<sup>228</sup>



**(9) Require public sector access to private sector business continuity and emergency response plans for fuel emergencies regarding critical fuels sector infrastructure as well as privately arranged efforts by critical fuel suppliers to allocate supplies to address fuel disruptions, in each case subject to appropriate protection for demonstrated proprietary information.**

Business continuity and response plans are key tools used by industry to prepare for and manage fuel disruptions but are generally not shared with the public sector.<sup>229</sup>

Providing public decision-makers access to such information in relation to energy emergencies would assist them in understanding what to expect from key fuel assets and operations, and help them to coordinate their actions with the private sector, as noted by the NPC in its report.<sup>230</sup> Information on capabilities, plans, priorities, and vulnerabilities of their operations during disruptions is especially critical.<sup>231</sup> Access to these plans would further facilitate joint industry–public sector planning, which the NPC specifically recommends because the knowledge obtained during such planning can be incorporated into companies’ business continuity and emergency plans.<sup>232</sup> Company information reported to the government, where appropriate, should be treated as proprietary and confidential.

Access by the public sector should include:

- Industry business continuity and emergency response plans, including planned resiliency enhancements, for critical infrastructure and related power systems, such as response plans of electric utilities for restoring service to critical fuel chain infrastructure.
- Industry plans and activities to allocate or otherwise redirect fuel supplies to accommodate emergency conditions. Arrangements, such as workarounds, to allocate supplies during fuel disruptions should be reported to the public sector during emergencies prior to implementation to facilitate coordination of private and public sector options to provide fuel to areas in need.<sup>233</sup>
- Protection from public disclosure of proprietary information.

Access to business continuity and response plans could be provided during joint industry–public sector exercises or through other channels that include appropriate protections against disclosure of proprietary information.

Entities in the petroleum business are familiar with the process and purpose of providing emergency response plans to government officials. They are subject to a variety of environmental and safety laws that require the provision of response plans to address environmental and safety threats and emergencies to state and federal officials.<sup>234</sup>

Moreover, regulated electric utilities—responsible for providing power to critical fuel sector infrastructure—are required to file emergency response plans with public utility regulators in New York State and New Jersey, including power restoration procedures and responsibilities.<sup>235</sup> Given the critical role played by fuel supplies in protecting public health and welfare, it would seem equally prudent to at least allow public sector access to the response plans with officials responsible for managing responses to fuel emergencies. Also, access to response plans of the petroleum sector may assist power suppliers and their regulators in coordinating restoration plans with fuel sector customers, in part by creating a better understanding of the nature of and potential deficiencies in the electrical systems of their customers.

**(10) Institutionalize, through a formal agreement, the joint gathering and sharing of critical information and coordination of response efforts of New York and New Jersey to address fuel emergencies affecting the New York Tri-state area.**

As noted earlier, New York State relies on refineries in Pennsylvania and New Jersey, and pipelines, terminals, and ports within New Jersey for fuel supplies. Given the complex and numerous multijurisdictional interdependencies critical to the operation of the New York Tri-state area liquid fuels supply chain, it is imperative to establish a permanent structure and communications network and process among states with critical infrastructure in the region for sharing information and coordinating emergency preparation and response for fuel disruptions.

To do so, New York and New Jersey should enter into a Memorandum of Understanding (MOU) modeled on the MOU they entered into September 24, 2014, to address terrorism.<sup>236</sup> At a minimum, the MOU should establish protocols to enhance coordination and cooperation regarding

- preparedness and response with respect to fuel emergencies;
- sharing and coordinating efforts to gather critical information for assessing and responding to fuel emergencies;
- review, grant, and implementation of regulatory relief to expedite fuel distribution; and
- use of refined product reserves and related demand management options.

The MOU should also provide for coordination with and other appropriate involvement by New York City given the extensive interdependencies of its fuels sector with New Jersey.

DOE and DHS should also be encouraged to participate formally in the MOU or at least in an advisory capacity, owing to their regional and national resources and perspectives. Pennsylvania, Connecticut, and Massachusetts, and possibly other New England states, should also be consulted to evaluate their interest in and potential contributions to a formal regional pact to address fuel emergencies.

In guidance prepared for states regarding regional coordination and communication, NASEO observed: “Energy disruptions are often caused by events that affect multiple states and, as such, *communications between affected states is very important in order to share information, enhance situational awareness, improve decision-making, and coordinate response actions...*”<sup>237</sup> (emphasis added). In this connection, NASEO has endorsed the use of MOUs “with neighboring states to promote information sharing and coordination of energy assurance planning and response activities.”<sup>238</sup>

The 2100 Commission established by New York Governor Andrew Cuomo after Sandy also expressed strong support for regional cooperation, stating “cooperation between neighboring states is essential where critical infrastructure systems cross state boundaries.”<sup>239</sup>

**(11) DOE should establish a program for and lead a series of regional drills and exercises among senior public sector and private sector stakeholders, including the power sector, to address fuel emergencies. These drills should be held on an annual basis, at minimum. States should also engage with industry and with other states with which they have significant interdependencies, and industry should reach out to states through periodic drills and exercises.**

After Sandy, DOE recommended regional exercises be conducted with state and local governments and the energy sector to help the public sector understand energy infrastructure and fuel markets and make more informed decisions during emergency responses.<sup>240</sup> Drills and exercises are also critical to improve and test communication systems and critical information needs. The NPC also finds that regional exercises ensure that response plans are well thought out. NASEO pointed out that “the structure of the liquid fuels market and limited regulation at the state level mean that exercise programs are essential to aid in mitigation of risks and increasing communications and information flow.”<sup>241</sup>

Since Sandy, DOE has conducted Energy Emergency Response Forums and Exercises at DOE headquarters.<sup>242</sup> In its FY 2014 and FY 2015 budget requests, DOE proposed a program for operational training and exercises focused on energy sector preparedness among public and private sector stakeholders at federal, state, and local levels. This proposal, as well as requests for increased funds for related state energy preparedness measures, was designed in part to implement recommendations by the NPC.<sup>243</sup> However, DOE’s proposals did not receive vigorous support from key stakeholders and were rejected. DOE continues to seek funding for similar initiatives.<sup>244</sup>

These are priority needs that deserve prompt attention by senior-level stakeholders and—based on the NPC report, appear to have industry support—that DOE should aggressively pursue.

**(12) Enhance formal coordination and communication between electric utilities and their petroleum sector customers to improve response to fuel disruptions, including priority restoration of power to them.**

As noted earlier, critical fuel supply chain infrastructure depends on power from the grid to function, and risks to grid resiliency are on the rise.<sup>245</sup> States should require regulated electric utilities to identify and restore power on a priority basis to critical fuel infrastructure in their service territories. To enhance cooperation among electric utilities and their priority fuel sector customers, utilities should also be required by regulators to conduct drills and exercises at least annually with these customers to test restoration plans and communication channels, strengthen relationships with them, and enhance understanding of the interdependencies of the fuel and power sectors. These drills and exercises—unlike those recommended earlier—would focus directly on the interdependence between specific critical fuel supply facilities and their power supplier, including vulnerabilities and the effectiveness of and need for improvements in regulatory options to restore power and communications in fuel emergencies. Public sector officials should be included either as participants and/or as observers depending on the exercise. This will facilitate evaluation of (a) power supply options available for key fuel facilities, such as use of mobile transformers and substations to replace damaged equipment and provide temporary power,<sup>246</sup> and (b) electronic systems to monitor the operational status of customers in real time, such as Advanced Metering Infrastructure (AMI), which can enable two-way communication and include real-time sensors, power outage notification, and power quality monitoring.

## CONCLUSION

The resiliency of the liquid fuels supply chain is a critical component of the energy security of the New York Tri-state region. Maximizing situational awareness and related formal regional coordination is essential to effectively prepare for and respond to fuel emergencies.

The twelve recommendations set forth here are designed to provide actionable and practical steps to address fuel disruptions and to strike a reasonable balance between efficient use of the market and responsible action by the public sector to protect public health and welfare, which can be supported by a wide range of stakeholders. The proposals are straightforward and are reasonable next steps to enhance situational awareness. They attempt to take into account the concerns of the private sector as well as the need for the public sector to perform its duty toward the well-being of citizens. Sustained leadership from senior-level stakeholders in the private and public sectors will be required to move forward on the critical issues and recommendations outlined in this paper, particularly regarding adequate funding and other resources, if the vulnerabilities of the regional liquid fuels supply chain to a growing number of threats are to be addressed.

## APPENDIX I: NEW YORK TRI-STATE AREA'S LIQUID FUELS SUPPLY CHAIN AND SANDY'S IMPACTS

### The New York Tri-State Area's Liquid Fuels Supply Chain

The East Coast (PADD 1)—including its Central Atlantic region, which encompasses New York, New Jersey, Pennsylvania, Delaware, and Maryland—has a significant imbalance between supply and demand for liquid fuels. The East Coast is the largest consumer of transportation fuels in the nation, consuming about 4.9 million b/d in 2014. Refinery production of these fuels, however, accounted for only about 20 percent of this amount. Consumption of transportation fuels in the Central Atlantic region was about 1.9 million b/d in 2014 with refinery production providing slightly more than one-half, and the rest provided by one pipeline from the Gulf Coast and imports from abroad.<sup>247</sup>

The New York Tri-state liquid fuels hub shares in this imbalance and is one of the most complex in the world, with critical components spread across multiple state and local jurisdictions.

New York State consumes approximately 600,000 barrels, or 25.2 million gallons, per day.<sup>248</sup> All petroleum fuels (including gasoline, diesel fuel, heating fuel, and related additives such as ethanol) consumed in New York are produced in and transported from other states and countries—in particular from several refineries in New Jersey, Pennsylvania, Delaware, as well as refineries from the Gulf Coast and abroad. Petroleum products are delivered to the New York Tri-state area from other jurisdictions primarily via (1) the Colonial and Buckeye Pipeline systems (the Colonial system runs from the Gulf Coast to New Jersey where it connects to the Buckeye Pipeline and terminal hub in Linden, New Jersey), and (2) by marine tankers and barges from the Gulf Coast and from other countries into the Port of New York and New Jersey (PNYNJ) (a relatively small amount of fuel arrives by truck).<sup>249</sup>

PNYNJ is the world's largest petroleum products hub and houses fuel terminals with a combined storage capacity exceeding 75 million barrels that receive

products primarily by pipeline, barges, and tankers, with some additional volumes received by rail.<sup>250</sup>

Linden, New Jersey, is essentially the crossroads of PNYNJ's pipeline network and also a primary staging point for oil shipments to and from PNYNJ. Once fuel comes into PNYNJ, products usually are first stored in bulk storage terminals on the waterfront of New Jersey and around New York City.<sup>251</sup>

Large terminals typically supply smaller terminals by pipeline and barge; these so-called distribution terminals blend in additives as required by law or depending on the commercial product, and distribute the fuels mainly by truck and barge to retailers or end users from New York to Massachusetts. Some 60 million people across the Northeast and New England states in part depend on PNYNJ—which covers about 125 square miles in New York and New Jersey—for fuel supplies.<sup>252</sup>

The critical facilities for the New York Tri-state liquid fuels supply system are noted below.<sup>253</sup>

#### (1) Regional refineries:<sup>254</sup>

- Two refineries in New Jersey (Phillips 66 in Bayway, 238,000 b/d; PBF Energy Co. refinery in Paulsboro, 160,000 b/d);
- One in Delaware (PBF Energy Co. in Delaware City, 182,000 b/d);
- Two refineries in Pennsylvania (Philadelphia Energy Solutions in Philadelphia, 335,000 b/d; Monroe Energy in Trainer, 185,000 b/d).

#### (2) Pipelines:

- The Colonial Pipeline Company system—which originates in the Gulf Coast in Texas and traverses through twelve states—and its 885,000 b/d Line 3 terminates in Linden, New Jersey, where it connects to the Intra Harbor Transfer System, which in turn connects to about twenty-three terminals and facilities in New York and New Jersey and also the Buckeye Pipeline system. It delivers up to 15 percent of East Coast fuel demand.<sup>255</sup>



- Buckeye Partners. LP's Northeast pipeline system originates in Linden, New Jersey, and receives fuel from seventeen major source points, including the Colonial Pipeline and five other connecting pipeline systems, two refineries, and nine storage and terminal facilities. This pipeline throughputs approximately 500,000 b/d of gasoline, diesel, and jet fuel daily. Of this, approximately 120,000 b/d is jet fuel delivered directly to the three regional airports (Newark, JFK, LaGuardia), with the remaining volume going to terminals in the New York City metropolitan area (including Long Island and the Bronx), Western Pennsylvania, and Upstate New York.<sup>256</sup> Fuel is propelled through these pipelines by pumping stations, which are powered by electricity delivered by utilities.

**(3) Bulk terminals:** Around the PNYNJ area, there are approximately thirty bulk terminals. The New York metropolitan area holds over 15 million barrels of capacity, with another twenty-five terminals with over 60 million barrels located in Northern New Jersey.<sup>257</sup> According to the EIA, pre-Sandy product inflows to these terminals was approximately 1.4 million b/d of petroleum products (including 941,000 b/d of gasoline), while about 1.34 million b/d (including 838,000 b/d of gasoline) were delivered from these terminals.<sup>258</sup> The terminals receive on average 335,000 b/d of imported fuel.<sup>259</sup>

Terminals are dependent on power supplied from the grid and equipment maintained by utilities up to the fence line of the terminal. Terminals are, however, responsible for the electrical system that receives the power from the grid at its property line, and its reliability.

**(4) Shippers and barge operators/owners:** Hundreds of seagoing oil tankers deliver petroleum and chemicals from around the world to PNYNJ.<sup>260</sup> On average, 350,000 b/d of fuel were delivered via tankers in 2015.<sup>261</sup> In addition, some one hundred petroleum barges usually transit the harbor, carrying and distributing fuel up the East Coast. Each barge can carry up to 100,000 barrels of fuel.<sup>262</sup>

**(5) Ports and docking facilities:** There are approximately twenty-eight facilities, including refineries and terminals, with port and docking facilities

in PNYNJ.<sup>263</sup> Two main navigational channels in the harbor—the Arthur Kill (a tidal strait separating Staten Island, New York, and mainland New Jersey) and the Kill Van Kull (a tidal strait separating Bayonne, New Jersey, and Staten Island, New York)—host a concentration of fuel infrastructure, including refineries and storage facilities, and thus are frequented by large tankers and barges.

**(6) Petroleum marketers/distributors/prime suppliers:** There are over 800 fuel marketers and wholesalers who sell and distribute motor fuels and heating oil in New York and New Jersey markets, with about fifty major distributors for Downstate New York.<sup>264</sup> Situational awareness with respect to this component of the supply chain is focused on understanding the end destination of the fuel after it is distributed from the terminal, and whether it is going to priority end users, such as strategically defined gasoline stations with backup generators.

**(7) Retail gasoline stations:** There are approximately 800 retail gasoline stations in New York City and approximately 2,000 retail gasoline stations in the New York downstate area.<sup>265</sup> There are around 2,600 filling stations in New Jersey.<sup>266</sup> Average total daily use of gasoline in New York City (defined as five boroughs and Long Island) is around 140,000 b/d, and when including Westchester and Rockland counties, this figure rises to nearly 170,000 b/d.<sup>267</sup>

This regional supply chain dynamic inherently creates situational awareness and communication challenges for information that must be shared across states, not just within a state. During fuel emergencies, New York officials need critical information relating to fuel infrastructure based in and regulated by New Jersey and Pennsylvania, and which traverses various other states. During Sandy, critical information had to be shared not only between industry and the public sector, but also among different government units at different levels in different jurisdictions.

**Superstorm Sandy's Impacts on the Fuel Supply Chain** Sandy had multiple and devastating impacts upon the Northeast's liquid fuels supply chain.<sup>268</sup> Based on EIA surveys, between 7 to 14 days after Sandy, overall product inflows coming into the PNYNJ were at 65 percent of pre-storm averages, while overall deliveries (outflows) depending on product type were from 20 percent to 72 percent of pre-storm levels.<sup>269</sup> Notable reasons for the extent of the disruption are discussed below.

### Supply side

- **Refineries:** More than two-thirds of the East Coast's entire refining capacity was preemptively shut down or curtailed prior to the storm.<sup>270</sup> Both refineries in Northern New Jersey, with a combined capacity of over 300,000 b/d, remained closed until November 13, over two weeks after the storm made landfall. The refineries in Southern New Jersey, Pennsylvania, and Delaware were largely able to resume operations within 2–4 days of the storm.<sup>271</sup>
- **Pipelines:**
  - **Colonial Pipeline** was not damaged but remained shut for 4–5 days after the storm due to terminal and storage power and infrastructure issues (e.g., there was nowhere for the fuel to go or to be stored).<sup>272</sup>
  - **Buckeye Pipeline** was damaged, with extensive loss of power for supporting operations, and was shut down for five days before resuming operations on November 3.<sup>273</sup>
- **Harbor and port facilities and waterways:** There was extensive damage to waterways, marine facilities, and vessels used to bring in and transport fuel throughout the PNYNJ area.<sup>274</sup> For tug, barge, and deep-draft vessels, certain areas of the harbor were closed to traffic for 3–5 days after the storm, owing largely to debris and obstructions in the harbor.<sup>275</sup> The Arthur Kill and Kill Van Kull are major chokepoints in the petroleum supply chain. During Sandy, a large number of the terminals on their banks were flooded, oil spills occurred, and they were closed or restricted in use.<sup>276</sup> Complete restrictions were not lifted for the Arthur Kill waterway until eight days after Sandy made landfall.<sup>277</sup>
  - Even after waterways were opened, many marine-based terminal and storage facilities were not operational due to power loss and other damage.

difficult to receive and offload fuel at pre-Sandy rates, as power is essential to operate equipment, such as pumps that move fuel out of storage, truck racks, barge berths, and so on.

- Three days after the storm, all fuel terminals in the New York metropolitan area were out of service; ten days after the Sandy, 79 percent were operational.<sup>279</sup>

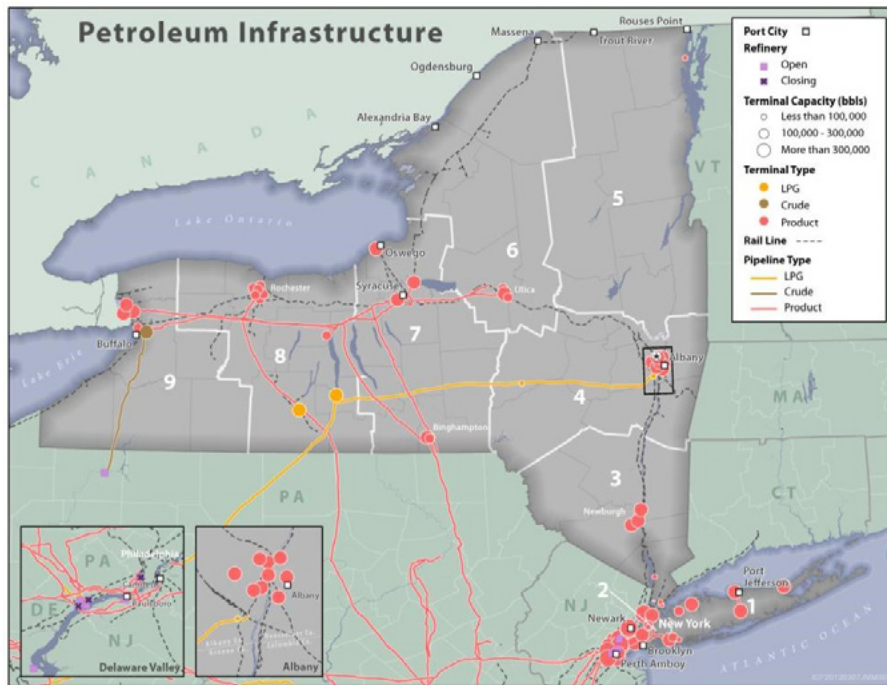
- **Wholesalers/retailers:** The lack of operational terminals and the inability to intake and offload limited supply to wholesalers and retailers resulted in gas shortages, long lines, and ultimately rationing and demand management policies implemented by two states and New York City (for the first time since the 1970s).

- Two-thirds of the New York metropolitan area stations were without fuel on November 2, 2012, three days after Sandy.<sup>280</sup> By November 11, nearly two weeks after the storm made landfall, nearly 30 percent of retail gas stations still did not have gasoline for sale.<sup>281</sup>

### Distribution side

- **Terminals:** Some fifty-eight fuel storage terminals around PNYNJ (in both New Jersey and New York) suffered infrastructure damage and power loss, usually due to severe flooding from storm surge.<sup>278</sup> Saltwater storm surge damaged both marine electrical infrastructure as well as backup generators, forcing facilities to wait for power restoration services. Even after access to waterways was restored, the lack of power made it very

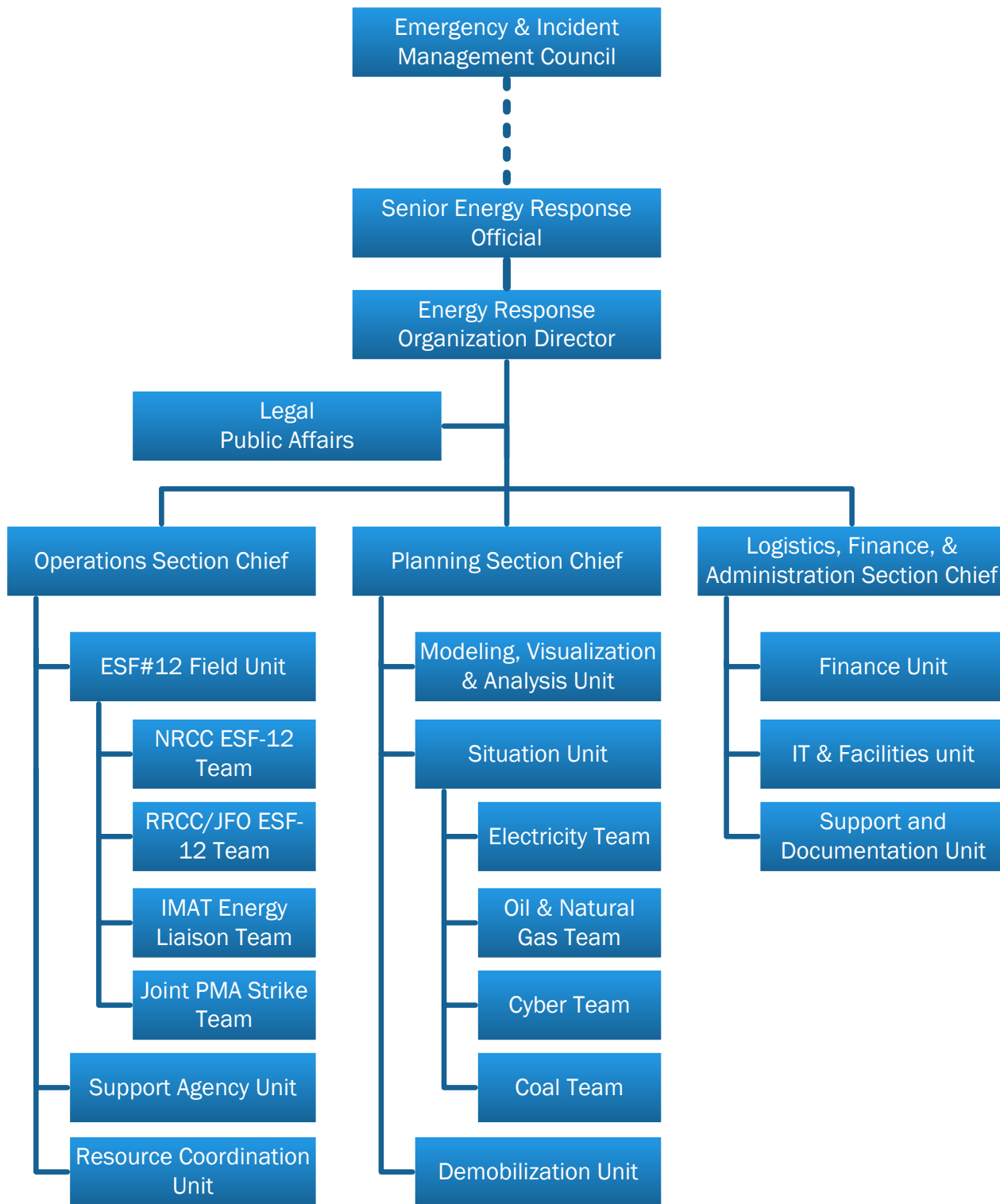
Figure 1: New York State petroleum Terminal infrastructure



Source: New York State Petroleum Terminal Resiliency Assessment (March 2014), NYSER-DA, submitted by ICF International, [www.icfi.com](http://www.icfi.com) page 11



# APPENDIX II: THE US DEPARTMENT OF ENERGY'S ENERGY RESPONSE ORGANIZATION



Source: US Department of Energy.

# APPENDIX III: NEW YORK STATE SENATE BILL NO. 7210 (APRIL 6, 2016)

S T A T E O F N E W Y O R K

7210

I N S E N A T E

April 6, 2016

Introduced by Sen. GRIFFO -- (at request of the Energy Research Development Authority) -- read twice and ordered printed, and when printed to be committed to the Committee on Energy and Telecommunications

AN ACT to amend the energy law, in relation to registration and reporting by major petroleum suppliers and pipeline operators

THE PEOPLE OF THE STATE OF NEW YORK, REPRESENTED IN SENATE AND ASSEMBLY, DO ENACT AS FOLLOWS:

1 Section 1. The energy law is amended by adding a new article 13 to  
2 read as follows:

3 ARTICLE 13

4 REGISTRATION AND REPORTING BY MAJOR PETROLEUM SUPPLIERS AND  
5 PIPELINE OPERATORS

6 SECTION 13-101. DEFINITIONS.

7 13-103. REGISTRATION AND REPORTING REQUIREMENTS.

8 13-105. RULES AND REGULATIONS.

9 13-107. CONFIDENTIALITY.

10 13-109. VIOLATIONS.

11 S 13-101. DEFINITIONS. AS USED IN THIS ARTICLE, THE FOLLOWING TERMS  
12 SHALL HAVE THE FOLLOWING MEANINGS:

13 1. "AUTHORITY" MEANS THE NEW YORK STATE ENERGY RESEARCH AND DEVELOP-  
14 MENT AUTHORITY.

15 2. "MAJOR PETROLEUM SUPPLIER" MEANS THE LICENSEE OF A MAJOR OIL STOR-  
16 AGE FACILITY.

17 3. "MAJOR OIL STORAGE FACILITY" MEANS A PETROLEUM DISTRIBUTION FACILI-  
18 TY WITH A MINIMUM ACTIVE STORAGE CAPACITY OF FOUR HUNDRED THOUSAND  
19 GALLONS THAT IS NOT OPEN TO THE PUBLIC, DISTRIBUTES PETROLEUM TO OTHERS  
20 FOR ULTIMATE USE, AND IS SUBJECT TO THE LICENSING REQUIREMENTS OF  
21 SECTION ONE HUNDRED SEVENTY-FOUR OF THE NAVIGATION LAW.

22 4. "PETROLEUM PRODUCT PIPELINE" MEANS A SYSTEM THAT TRANSPORTS PETRO-  
23 LEUM PRODUCTS FROM REFINERIES, BULK TERMINALS, OR MARINE FACILITIES TO  
24 OTHER TERMINALS OR TO INTERCONNECTIONS WITH OTHER PIPELINES WITHIN NEW  
25 YORK STATE.

EXPLANATION--Matter in ITALICS (underscored) is new; matter in brackets  
[ ] is old law to be omitted.

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1 5. "PETROLEUM PRODUCT PIPELINE OPERATOR" MEANS THE PERSON RESPONSIBLE  
2 FOR THE OPERATION OF A PETROLEUM PRODUCT PIPELINE LOCATED IN NEW YORK  
3 STATE.

4 6. "PETROLEUM" MEANS OIL OR REFINED PRODUCT OF ANY KIND AND IN ANY  
5 FORM INCLUDING, BUT NOT LIMITED TO, CRUDE OR UNREFINED OIL, GASOLINE  
6 COMPONENTS (INCLUDING ETHANOL), DISTILLATES INCLUDING PRODUCTS USED FOR  
7 TRANSPORTATION OR SPACE HEATING AND WATER HEATING, KEROSENE, PROPANE OF  
8 ANY FEEDSTOCK DERIVATION, AND RESIDUAL OILS INCLUDING FUEL OIL FOR ELEC-  
9 TRIC GENERATION FACILITIES.

10 S 13-103. REGISTRATION AND REPORTING REQUIREMENTS. 1. REGISTRATION  
11 REQUIREMENTS. (A) ON OR BEFORE OCTOBER FIRST, TWO THOUSAND SIXTEEN, EACH  
12 MAJOR PETROLEUM SUPPLIER SHALL FILE A REGISTRATION STATEMENT WITH THE  
13 AUTHORITY CONTAINING SUCH INFORMATION AND IN SUCH FORM AS PRESCRIBED BY  
14 THE AUTHORITY, INCLUDING, BUT NOT LIMITED TO FACILITY NAME, PHYSICAL AND  
15 MAILING ADDRESSES, FACILITY LICENSE IDENTIFICATION NUMBER, NAME OF  
16 LICENSEE, LIST OF ACTIVE STORAGE TANKS WITH CAPACITIES AND TYPICAL  
17 CONTENTS, AND A DESCRIPTION OF THE MODES OF TRANSPORTATION AVAILABLE FOR  
18 DELIVERING PETROLEUM TO AND FROM THE FACILITY. THE REGISTRATION STATE-  
19 MENT MUST ALSO INCLUDE E-MAIL AND TELEPHONE CONTACT INFORMATION WHERE  
20 THE SUPPLIER CAN BE CONTACTED IN THE EVENT OF AN ENERGY OR FUEL SUPPLY  
21 EMERGENCY. THIS INFORMATION SHALL BE KEPT CURRENT AT ALL TIMES. ANY  
22 MAJOR PETROLEUM SUPPLIER THAT COMMENCES OPERATIONS AFTER OCTOBER FIRST,  
23 TWO THOUSAND SIXTEEN SHALL FILE A REGISTRATION STATEMENT WITHIN THIRTY  
24 DAYS OF COMMENCING OPERATIONS.

25 (B) ON OR BEFORE OCTOBER FIRST, TWO THOUSAND SIXTEEN, EACH PETROLEUM  
26 PRODUCT PIPELINE OPERATOR SHALL FILE A REGISTRATION STATEMENT WITH THE  
27 AUTHORITY CONTAINING SUCH INFORMATION AND IN SUCH FORM AS PRESCRIBED BY  
28 THE AUTHORITY, INCLUDING, BUT NOT LIMITED TO OPERATOR NAME, REPRESEN-  
29 TATIVE'S NAME, MAILING ADDRESS, EMERGENCY CONTACT INFORMATION INCLUDING  
30 PHONE NUMBER AND E-MAIL ADDRESS, MAP SHOWING THE LOCATION OF THE PIPE-  
31 LINE UNDER THE OPERATOR'S CONTROL WITHIN NEW YORK STATE, PIPELINE FLOW  
32 CAPACITIES, TYPICAL PETROLEUM PRODUCT TYPES TRANSPORTED, TYPICAL QUANTI-  
33 TIES TRANSPORTED PER YEAR, AND DELIVERY POINTS. ANY PETROLEUM PRODUCT  
34 PIPELINE OPERATOR THAT COMMENCES OPERATIONS AFTER OCTOBER FIRST, TWO  
35 THOUSAND SIXTEEN SHALL FILE A REGISTRATION STATEMENT WITHIN THIRTY DAYS  
36 OF COMMENCING OPERATIONS.

37 2. ANNUAL REPORTING REQUIREMENTS. (A) ON OR BEFORE FEBRUARY FIRST, TWO  
38 THOUSAND SEVENTEEN AND EACH FEBRUARY FIRST THEREAFTER EACH MAJOR PETRO-  
39 LEUM SUPPLIER SHALL FILE A REPORT WITH THE AUTHORITY FOR THE PRIOR  
40 CALENDAR YEAR CONTAINING SUCH INFORMATION AND IN SUCH FORM AS PRESCRIBED  
41 BY THE AUTHORITY, INCLUDING, BUT NOT LIMITED TO, ACTIVE TANKS AND CAPAC-  
42 ITIES; PETROLEUM PRODUCT TYPES; ORIGINATION POINTS; DELIVERY POINTS;  
43 THROUGHPUT BY PETROLEUM PRODUCT TYPE; MODAL TRANSPORTATION CAPABILITIES;  
44 BACKUP POWER CAPABILITY; AND DISPENSING CAPABILITY.

45 (B) ON OR BEFORE FEBRUARY FIRST, TWO THOUSAND SEVENTEEN AND EACH  
46 FEBRUARY FIRST THEREAFTER EACH PETROLEUM PRODUCT PIPELINE OPERATOR SHALL  
47 FILE A REPORT WITH THE AUTHORITY FOR THE PRIOR CALENDAR YEAR CONTAINING  
48 SUCH INFORMATION AND IN SUCH FORM AS PRESCRIBED BY THE AUTHORITY,  
49 INCLUDING, BUT NOT LIMITED TO, OPERATIONAL STATUS, PIPELINE FLOW CAPACI-  
50 TIES, TYPICAL PETROLEUM PRODUCT TYPES TRANSPORTED, TYPICAL QUANTITIES  
51 TRANSPORTED PER YEAR, AND DELIVERY POINTS.

52 3. QUARTERLY REPORTING REQUIREMENTS. (A) ON OR BEFORE THIRTY DAYS  
53 FOLLOWING THE END OF EACH CALENDAR QUARTER, EACH MAJOR PETROLEUM SUPPLI-  
54 ER SHALL FILE A REPORT WITH THE AUTHORITY CONTAINING SUCH INFORMATION  
55 AND IN SUCH FORM AS PRESCRIBED BY THE AUTHORITY, INCLUDING, BUT NOT  
56 LIMITED TO, PETROLEUM PRODUCT TYPES AND QUANTITIES RECEIVED AND DISTRIB-

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1 UTED; FUEL VOLUMES DELIVERED OR DISTRIBUTED SPECIFIC TO FUEL TYPE, ORIG-  
2 INATION AND DELIVERY POINTS, AND MODE OF TRANSPORTATION; OPERATIONAL  
3 STATUS; CURRENT INVENTORY; AND FACILITY CHANGES FROM THE INFORMATION  
4 PROVIDED IN THE MOST RECENT ANNUAL REPORT.

5 (B) ON OR BEFORE THIRTY DAYS FOLLOWING THE END OF EACH CALENDAR QUAR-  
6 TER, EACH PETROLEUM PRODUCT PIPELINE OPERATOR SHALL FILE A REPORT WITH  
7 THE AUTHORITY FOR THE PRIOR CALENDAR QUARTER CONTAINING SUCH INFORMATION  
8 AND IN SUCH FORM AS PRESCRIBED BY THE AUTHORITY, INCLUDING, BUT NOT  
9 LIMITED TO, OPERATIONAL STATUS, PIPELINE FLOW CAPACITIES, VOLUMES OF  
10 PETROLEUM PRODUCT TYPES TRANSPORTED, AND DELIVERY POINTS.

11 4. REPORTING REQUIREMENTS IN THE EVENT OF AN ENERGY OR FUEL SUPPLY  
12 EMERGENCY. (A) IN THE EVENT OF A DECLARATION BY THE GOVERNOR OF AN ENER-  
13 GY OR FUEL SUPPLY EMERGENCY PURSUANT TO SECTION 5-117 OF THIS CHAPTER,  
14 EACH MAJOR PETROLEUM SUPPLIER SHALL FILE A REPORT WITH THE AUTHORITY AT  
15 LEAST DAILY, CONTAINING SUCH INFORMATION AND IN SUCH FORM AS PRESCRIBED  
16 BY THE AUTHORITY, INCLUDING, BUT NOT LIMITED TO, PETROLEUM PRODUCT  
17 INVENTORIES; OPERATIONAL STATUS; STATUS OF ACCESS TO THE FACILITY; AND  
18 FACILITY OPERATIONS CHANGES FROM THE INFORMATION PROVIDED IN THE SUPPLI-  
19 ER'S MOST RECENT REPORT. IN ADDITION, IN THE EVENT OF SUCH EMERGENCY,  
20 THE SUPPLIER SHALL BE AVAILABLE TO IMMEDIATELY RESPOND TO INQUIRIES FROM  
21 THE AUTHORITY BY E-MAIL AND/OR TELEPHONE AT THE E-MAIL ADDRESS OR TELE-  
22 PHONE NUMBER PROVIDED IN ITS REGISTRATION STATEMENT.

23 (B) IN THE EVENT OF A DECLARATION BY THE GOVERNOR OF AN ENERGY OR FUEL  
24 SUPPLY EMERGENCY PURSUANT TO SECTION 5-117 OF THIS CHAPTER, EACH PETRO-  
25 LEUM PRODUCT PIPELINE OPERATOR SHALL FILE A REPORT WITH THE AUTHORITY AT  
26 LEAST DAILY, CONTAINING SUCH INFORMATION AND IN SUCH FORM AS PRESCRIBED  
27 BY THE AUTHORITY, INCLUDING, BUT NOT LIMITED TO, PIPELINE OPERATIONAL  
28 STATUS AND PRODUCT CURRENTLY BEING TRANSPORTED.

29 S 13-105. RULES AND REGULATIONS. THE AUTHORITY MAY PROMULGATE SUCH  
30 RULES AND REGULATIONS AS IT DEEMS NECESSARY OR CONVENIENT TO CARRY OUT  
31 THE PURPOSES OF THIS ARTICLE.

32 S 13-107. CONFIDENTIALITY. NO INFORMATION SUBMITTED TO THE AUTHORITY  
33 UNDER THIS ARTICLE SHALL BE PUBLICLY DIVULGED BY AUTHORITY EMPLOYEES OR  
34 OFFICERS, AND ALL SUCH INFORMATION SHALL BE EXEMPT FROM DISCLOSURE  
35 PURSUANT TO PARAGRAPHS (D) AND (F) OF SUBDIVISION TWO OF SECTION EIGHT-  
36 Y-SEVEN OF THE PUBLIC OFFICERS LAW SINCE DISCLOSURE OF ANY SUCH INFORMA-  
37 TION COULD ENDANGER THE LIFE OR SAFETY OF ANY PERSON AND ARE TRADE  
38 SECRETS, PROVIDED, HOWEVER, THAT SUCH INFORMATION MAY BE MADE AVAILABLE  
39 TO ANY NEW YORK STATE ENTITY AS MAY BE DEEMED NECESSARY AND APPROPRIATE  
40 BY THE PRESIDENT OF THE AUTHORITY, WHICH ENTITY SHALL PROVIDE AT LEAST  
41 EQUAL PROTECTIONS TO SUCH INFORMATION.

42 S 13-109. VIOLATIONS. 1. ANY PERSON WHO VIOLATES ANY PROVISION OF  
43 THIS ARTICLE OR ANY RULE, REGULATION OR ORDER ISSUED PURSUANT THERETO  
44 SHALL BE LIABLE TO THE PEOPLE OF THE STATE FOR A CIVIL PENALTY IN AN  
45 AMOUNT OF NOT MORE THAN TEN THOUSAND DOLLARS FOR EVERY SUCH VIOLATION,  
46 PER DAY.

47 2. THE PENALTY PROVIDED IN SUBDIVISION ONE OF THIS SECTION SHALL BE  
48 RECOVERED IN AN ACTION OR SPECIAL PROCEEDING BROUGHT BY THE ATTORNEY  
49 GENERAL AT THE REQUEST AND IN THE NAME OF THE PRESIDENT OF THE AUTHORITY  
50 IN ANY COURT OF COMPETENT JURISDICTION.

51 3. ALTERNATIVELY, OR IN ADDITION TO THE ACTION OR PROCEEDING TO  
52 RECOVER THE CIVIL PENALTY PROVIDED IN SUBDIVISION ONE OF THIS SECTION,  
53 THE ATTORNEY GENERAL, UPON THE REQUEST OF THE PRESIDENT OF THE AUTHORI-  
54 TY, MAY INSTITUTE AN ACTION OR PROCEEDING TO ENJOIN ANY VIOLATION OF OR  
55 TO ENFORCE ANY PROVISION OF THIS ARTICLE OR ANY RULE, REGULATION OR  
56 ORDER ISSUED PURSUANT THERETO.

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1 4. ANY ACTION OR PROCEEDING COMMENCED TO RECOVER A PENALTY MAY BE  
2 SETTLED OR DISCONTINUED BY THE ATTORNEY GENERAL WITH THE CONSENT OF THE  
3 PRESIDENT OF THE AUTHORITY.  
4 S 2. This act shall take effect immediately.



## NOTES

- 1 Following Superstorm Sandy, the City of New York asked CGEP to assist in convening relevant public and private sector stakeholders to develop a “strategy that will achieve the goal of hardening pipelines, refineries, and terminals critical for maintaining fuel supplies in the [New York Tri-state]...region.” City of New York. “A Stronger, More Resilient New York” (2013) (SMRNY) Initiative 1 at 141.
- 2 See summary of 5/9/14 CGEP forum at <http://energypolicy.columbia.edu/on-the-record/summary-roundtable-resilience-liquid-fuel-supply-chain-new-york-area> (5/9/14 Forum).
- 3 See summary of 10/17/14 CGEP forum at <http://energypolicy.columbia.edu/on-the-record/summary-second-roundtable-resilience-liquid-fuel-supply-chain-new-york-tri-state-area> (10/17/14 Forum). (Referred to herein together with the 5/9/14 Forum as the “CGEP Forums.”)
- 4 The CGEP Forums were conducted pursuant to the Chatham House Rule which provides that “when a meeting...is held under the Chatham House Rule, participants are free to use the information received, but neither the identity nor the affiliation of the speaker(s), nor that of any other participant, may be revealed.” Available at [chathamhouse.org/About/chatham-house-rule](http://chathamhouse.org/About/chatham-house-rule).
- 5 See Appendix I of the Report at pages 35-37 for a description of the New York Tri-state area’s liquid fuels supply chain and a summary of Sandy’s impacts.
- 6 SMRNY at 133; President’s Office of Science and Technology, “Third National Climate Assessment, Climate Change Impacts in the United States, US National Climate Assessment” (May 2014) at 41, 71. While growing efforts to move to low carbon energy alternatives, e.g., electrification of vehicles, will over time alter the nature of the energy system and related resiliency challenges, for the foreseeable future fossil fuels will remain a critical energy source. DOE 2015 Quadrennial Technology Review: An Assessment of Energy Technologies and Research Opportunities, Chapter 7 (Unconventional Oil and Gas), at 1. Available at [energy.gov/quadrennial-technology-review-2015](http://energy.gov/quadrennial-technology-review-2015).
- 7 See footnotes 2 and 3 of the Report; SMRNY at 141. “Real time” generally refers to daily (or possibly more or less frequently depending on circumstances) reports of the best current information available to facility operators on the operational status and capacity of a facility, available and expected fuel supplies, and time and plans for restoration to normal operations, including at a minimum the data available to and monitored by the facility at the time of reporting; it does not mean minute-by-minute reporting of fuel flows nor is it intended to imply installation of continuous monitoring equipment.
- 8 See New York State Moreland Commission on Utility Storm Preparation and Response: Final Report (2013) at 14. (Moreland Commission Report). Available at <http://www.governor.ny.gov/assets/documents/MACfinalreportjune22.pdf>. See also New York State Public Service Commission (PSC) Order Approving Electric Emergency Plans, December 15, 2013. Available at <http://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterCaseNo=13-E-0550&submit=Search+by+Case+Number>.
- 9 New York City Hurricane Sandy After-Action Report to Mayor Michael R. Bloomberg (May 2013) (NYC AAR) at 21. New Jersey supplemented the ad hoc approach with representatives of fuel trade associations who voluntarily served in its emergency operations center to secure information as well as through other industry contacts who served on a voluntary basis as members of the Infrastructure Advisory Committee established prior to Sandy, pursuant to the New Jersey Domestic Security Preparedness Act “to act as a liaison to private industry...and establish ongoing communications between private industry...and state and local officials.” NJ Rev. Stat & App. A: 9–70 (2013). Available at [http://www.njleg.state.nj.us/2000/Bills/pl01/246\\_.pdf](http://www.njleg.state.nj.us/2000/Bills/pl01/246_.pdf).
- 10 CGEP Forums. See summaries here: <http://energypolicy.columbia.edu/on-the-record/summary-roundtable-resilience-liquid-fuel-supply-chain-new-york-area>; <http://energypolicy.columbia.edu/on-the-record/summary-second-roundtable-resilience-liquid-fuel-supply-chain-new-york-tri-state-area>
- 11 CGEP Forums.

- 12 CGEP Forums. During the CGEP Forums and in follow-up research and interviews, it was also noted that salt water caused substantial damage to onsite electrical equipment at terminals, which delayed their restart even as grid power was restored to the fence line.
- 13 New York State, like several other states, has authority to establish a fuel set-aside program requiring certain suppliers to make available up to 3 percent of their total available monthly supply of petroleum products to the state for allocation to priority users. NYS Energy Law, Section 10-105(2)(b).
- 14 Owing largely to the volatility of petroleum prices and weather, as well as potentially low profit margins, some stakeholders noted fuel suppliers generally maintain inventories as low as feasible to meet anticipated customer needs. CGEP Forums.
- 15 See “Post-Sandy Initiatives to Enhance Situational Awareness” Report at 15-21 for a detailed discussion of these initiatives.
- 16 See National Petroleum Council’s Report “Enhancing Emergency Preparedness for Natural Disasters” (December 2014) (NPC Report) discussed in detail at pages 22-26 of the Report; New York State Petroleum Terminal Resiliency Assessment, New York State Energy Research and Development Authority (2014); New Jersey Board of Public Utilities Press Release (5/21/14): “New Jersey Board of Public Utilities Approves \$1 Billion Energy Strong Storm Mitigation Plan Settlement with PSE&G.” Available at <http://nj.gov/bpu/pdf/announcements/2014/Energy%20Strong%20BAM%205%2021%2014pr.pdf>; Forums.
- 17 See US Quadrennial Energy Review: Energy Transmission, Storage, and Distribution Infrastructure (2015): Appendix A (Liquid Fuels) at 58–61, 63 (QER). Available at [energy.gov/epsa/quadrennial-energy-review-first-installment](http://energy.gov/epsa/quadrennial-energy-review-first-installment). DOE 2015 Energy Sector-Specific Plan, prepared for DHS as part of the National Infrastructure Protection Plan (2015 ESSP), Sections 2.2 and 4.1.2 (risks) and Section 4.3 (voluntary information sharing). Available at [energy.gov/oe/downloads/2015-energy-sector-specific-plan](http://energy.gov/oe/downloads/2015-energy-sector-specific-plan); DOE 2016 Congressional Budget Request (2015) at 378. Available at [energy.gov/cfo/downloads/fy-2016-budget-justification](http://energy.gov/cfo/downloads/fy-2016-budget-justification). United States Fuel Resiliency: Volume III US Fuels Supply Infrastructure Vulnerabilities and Resiliency (September 2014) (USFR III), prepared for DOE by INTEK, Inc. at 18–22. Available at [energy.gov/epsa/qer-document-library](http://energy.gov/epsa/qer-document-library).
- 18 10/17/14 Forum. NPC Report at 44–48.
- 19 10/17/14 Forum. Other constraints noted include limited statutory authority and lack of a centralized system, including identified responsible officials and private sector contacts to organize the process and coordinate it regionally.
- 20 Letter dated 11/2/12 from Lisa Jackson, administrator of the United States Environmental Protection Agency to New York State Governor Andrew Cuomo and Pennsylvania Governor Tom Corbett. Re: November 2012 Fuel Waiver Concerning the Use of Diesel Fuel for Disaster Recovery in the State of New York and the Commonwealth of Pennsylvania. Available at [epa.gov/enforcement/fuel-waivers#2012](http://epa.gov/enforcement/fuel-waivers#2012).
- 21 See US Environmental Protection Agency, “Fuel Waivers,” [www.epa.gov/enforcement/fuel-waivers](http://www.epa.gov/enforcement/fuel-waivers).
- 22 NPC Report at 46. See also NPC Report at 44–48; Oil and Natural Gas Industry Preparedness Handbook, American Petroleum Institute (2013) (API Handbook) at 28–34 for discussions of the types of regulatory relief potentially needed during fuel emergencies. API Handbook is Available at <http://www.api.org/~media/Files/Policy/Safety/ONG-Industry-Preparedness-Handbook-v2.pdf>.
- 23 46 USC Section 501(b).
- 24 DHS Secretary Jones Act waiver, November 2, 2012. See [dhs.gov/news/2012/11/02/secretary-apolitano-issues-temporary-blanket-jones-act-waiver](http://dhs.gov/news/2012/11/02/secretary-apolitano-issues-temporary-blanket-jones-act-waiver).
- 25 NPC Report at 48.
- 26 USFR III at 20. Available at [energy.gov/epsa/qer-document-library](http://energy.gov/epsa/qer-document-library).
- 27 NPC Report at 48.
- 28 10/17/14 Forum at 2. Releases of fuel from the one-million-barrel federal Northeast Refined Petroleum Product Reserve operated by DOE require a finding that there is a “severe energy supply interruption” as

- defined in the Energy Policy and Conservation Act. See <http://energy.gov/fe/statutory-authority-spr-drawdown>.
- 29 NPC Report at 10.
- 30 Historically, the upstream side of the industry was more consolidated in that there were fewer than ten major players in total in the refined product business, which made it easier to get information via an ad hoc system (e.g., make a call to Exxon). However, this is changing especially for downstream assets as a result of diversification of their ownership in the supply chain. See NPC Report at 10; CGEP Forums.
- 31 SMRNY at 133,141. The fuels sector is considered one of the “lifeline” functions (within energy). 2015 ESSP at vii. The US Department of Homeland Security (DHS) defines the lifeline sectors to include energy, transportation, communications and water as they provide “essential products and services that underpin the continued operation of nearly every business sector, community and government agency.”. See National Infrastructure Advisory Council: Strengthening Regional Resilience through National, Regional and Sector Partnerships. Draft Report and Recommendations (November 21, 2013). Available at [dhs.gov/sites/default/files/publications/niac-rrwg-report-final-review-draft-for-gbm.pdf](http://dhs.gov/sites/default/files/publications/niac-rrwg-report-final-review-draft-for-gbm.pdf). However, the fuels sector is not regulated, such as in terms of market activities, in the same way that the many other lifeline functions are, most notably power, communications, transportation, and water.
- 32 2015 ESSP Section 4.3.
- 33 5/9/14 Forum. Available at <http://energypolicy.columbia.edu/on-the-record/summary-roundtable-resilience-liquid-fuel-supply-chain-new-york-area>.
- 34 Overview of Response to Hurricane Sandy Nor’easter and Recommendations for Improvement, DOE (2013) (DOE Overview). Available at <http://energy.gov/oe/downloads/overview-response-hurricane-sandy-noreaster-and-recommendations-improvement-february>. NYC Hurricane Sandy After-Action Report and Recommendations to Mayor Michael R. Bloomberg (2013) at 21–22. Available at [http://www.nyc.gov/html/recovery/downloads/pdf/sandy\\_aar\\_5.2.13.pdf](http://www.nyc.gov/html/recovery/downloads/pdf/sandy_aar_5.2.13.pdf) (NYC AAR).
- 35 See Post-Sandy Initiatives to Enhance Situational Awareness Report at 22–33.
- 36 CGEP Forums; NYC AAR; API Handbook; DOE Overview.
- 37 CGEP Forums; NYC AAR; DOE Overview.
- 38 Emergency Support Function (ESF) #12. See <http://energy.gov/oe/downloads/emergency-support-function-12-energy-annex>; [http://www.fema.gov/media-library-data/20130726-1825-25045-9530/emergency\\_support\\_function\\_12\\_energy\\_annex\\_2008.pdf](http://www.fema.gov/media-library-data/20130726-1825-25045-9530/emergency_support_function_12_energy_annex_2008.pdf); [www.fema.gov/pdf/emergency/nims/NIMS-core.pdf](http://www.fema.gov/pdf/emergency/nims/NIMS-core.pdf). Sixteen critical infrastructure sectors—including energy—were identified by the President in Presidential Policy Directive 21 (Critical Infrastructure Security and Resilience), issued February 2013. Available at [whitenouse.gov/the-press-office/2013/02/12/presidential-policy-directive-critical-infrastructure-security-resil](http://whitenouse.gov/the-press-office/2013/02/12/presidential-policy-directive-critical-infrastructure-security-resil).
- 39 See DOE Energy Emergency Preparedness Quarterly (Spring/Summer 2014). Available at <http://energy.gov/oe/downloads/energy-emergency-preparedness-quarterly-vol-3-issue-2-springsummer-2014>.
- 40 Agencies such as DHS can supplement information and analysis provided by DOE through their own contacts. However, they do not have a formal process to gather and/or assess this information for the purpose of situational awareness; rather, they rely on DOE to provide appropriate assessments regarding energy matters.
- 41 About EIA. Available at <http://www.eia.gov/about/>
- 42 15 USC Section 772(b) provides: “All persons owning or operating facilities or business premises who are engaged in any phase of energy supply or major energy consumption shall make available to the Administrator such information and periodic reports, records, documents, and other data, relating to the purposes of this chapter...as the Administrator may prescribe by regulation or order as necessary or appropriate.” See also 15 USC Section 796; 42 USC Section 5916.
- 43 E.g., 10 CFR Section 207.7, which provides that criminal fines for willful violations shall not exceed \$5,000.00 per violation, and civil penalties for violations shall not exceed \$4,000.00 per violation.

- 44 See 15 USC Section 796(d); 42 USC Section 7135(g); 18 USC Section 1905.
- 45 Survey forms. Available at <http://www.eia.gov/survey/>. E.g., Form EIA–817: Monthly Tanker and Barge Movements Report; Form EIA–782C: Monthly Report of Prime Supplier Sales of Petroleum Products Sold for Local Consumption. Available at <http://www.eia.gov/survey/>.
- 46 44 USC Section 3507(a). E.g., EIA Agency Information Collection Extension, 80 Fed. Reg. 39424 (July 9, 2015); <http://energy.gov/cio/office-chief-information-officer/services/guidance/information-collection-management>. Approvals under the PWRA can last up to three years. 44 USC Section 3507(g).
- 47 See EIA Weekly Bulk Terminal Report (based on Form EIA–801). Available at <http://www.eia.gov/survey/>. This form requests information about end-of-week stock levels of selected finished petroleum products. For background on the PADD system, see <https://www.eia.gov/todayinenergy/detail.cfm?id=4890>. PADDs are geographic aggregations of the fifty states and the District of Columbia. PADD 1 is the East Coast. PADD 1A covers the New England states. PADD 1B covers the Central Atlantic states including New York, New Jersey, Pennsylvania, Delaware, and Maryland.
- 48 See EIA Weekly and Monthly Bulk Terminal and Blender Reports; Form EIA–801 and Form EIA–815. Available at <http://www.eia.gov/survey/>.
- 49 See 5 CFR Section 1320.13. During Sandy, EIA disseminated an emergency survey relating to the operational status of retail gas stations.
- 50 Form EIA–815 Monthly Bulk Terminal and Blender Report, p. 6. Available at <http://www.eia.gov/survey/>.
- 51 42 USC Section 17284; Communication with the National Association of State Energy Officials (NASEO) (December 2015).
- 52 See [www.federalregister.gov/articles/2001/05/29/01-13392/agency-information-collection-activities-proposed-collection-comment-request](http://www.federalregister.gov/articles/2001/05/29/01-13392/agency-information-collection-activities-proposed-collection-comment-request).
- 53 Communication with EIA (August 2014).
- 54 CGEP Forums. Also in 2014 following record cold, heating fuel prices, and supply disruptions, Congress directed EIA to notify governors of affected states whenever stocks of residential heating fuels (heating oil, natural gas, and propane) fell below the most recent five-year average for more than three consecutive weeks. Reliable Home Heating Oil Act of 2014, Section 3. <https://www.govtrack.us/congress/bills/113/s2086/text>. A prime purpose of the early warning requirement was to “assist States so they were able to declare a state of emergency before a large supply disruption occurs.” Senate Report 113–162 (5/20/14) at 2.
- 55 E.g., EIA state profile data for New York and for New Jersey. Available at <http://www.eia.gov/state/data.cfm?sid=NY> and <http://www.eia.gov/state/data.cfm?sid=NJ>.
- 56 FEMA, located within the DHS since 2003, is the lead federal agency responsible for assisting persons impacted by man-made and natural disasters. In this role FEMA generally oversees federal disaster preparedness, response, and recovery efforts. FEMA has ten regional offices. FEMA’s Region 2 office includes New York, New Jersey, Puerto Rico, and the Virgin Islands. See [www.fema.org](http://www.fema.org).
- 57 DOE Energy Emergency Preparedness Quarterly (1/15/13). Available at <http://energy.gov/oe/services/energy-assurance/emergency-preparedness>.
- 58 10/17/14 Forum; EIA, Hurricane Sandy New York City Metropolitan Area Retail Motor Gasoline Supply Report (11/9/12). Available at [http://www.eia.gov/special/disruptions/hurricane/sandy/gasoline\\_updates.cfm](http://www.eia.gov/special/disruptions/hurricane/sandy/gasoline_updates.cfm).
- 59 <http://energy.gov/articles/responding-hurricane-sandy-doe-situation-reports>. For example, in its third SR issued November 8, 2012, DOE reported that a “total of 57 terminals in the path of Hurricane Sandy have reported on their status in the aftermath of the storm” and also included the status of six refineries impacted by Sandy. Available at [www.oe.netl.doe.gov/emergency\\_sit\\_rpt.aspx](http://www.oe.netl.doe.gov/emergency_sit_rpt.aspx).
- 60 EIA, New York/New Jersey Intra Harbor Petroleum Supplies Following Hurricane Sandy: Summary of Impacts Through November 21, 2012. Available at [eia.gov/special/disruptions/hurricane/sandy/petroleum\\_terminal\\_survey.cfm](http://eia.gov/special/disruptions/hurricane/sandy/petroleum_terminal_survey.cfm).



- 61 DOE Overview of Response to Hurricane Sandy Nor'easter (2013) (DOE Overview). Available at <http://energy.gov/oe/downloads/overview-response-hurricane-sandy-noreaster-and-recommendations-improvement-february>.
- 62 DOE Overview at 7.
- 63 Ibid. These issues, among others, led to FEMA highlighting DOE's struggles in taking the lead in coordinating energy restoration efforts across both power and fuel sectors. See Hurricane Sandy FEMA After-Action Report (2013). Available at <https://www.fema.gov/media-library/assets/documents/33772>.
- 64 SMRNY at 136; CGEP Forums; NYC AAR.
- 65 CGEP Forums.
- 66 10/17/14 Forum. Summary Available at <http://energypolicy.columbia.edu/research/enhancing-resilience-new-york-tri-state-regional-energy-sector>.
- 67 The IAC is responsible for ongoing communication between private industry and state and local officials regarding domestic preparedness and the respective roles and responsibilities of the public and private sectors. See <http://www.njhomelandsecurity.gov/partners/>.
- 68 Under the New York State Energy Emergency Plan (December 2015) (NYEEP), in the event of a coal supply emergency declared by the governor, NYSERDA would require suppliers, distributors, and direct purchasers of coal to report (1) inventory and number of days of supply; (2) stocks in transit and number of days of supply; and (3) shipments expected for the next two thirty-day periods. NYEEP pp. 37–38. No such reporting requirements are included in the NYEEP in the event of a petroleum fuel emergency. NYEEP Section 5.2. Available at [www.nyserdanyc.org/-/media/Files/Publications/Energy-Analysis/NYS-Energy-Emergency-Plan-2015.pdf](http://www.nyserdanyc.org/-/media/Files/Publications/Energy-Analysis/NYS-Energy-Emergency-Plan-2015.pdf). A few states including California, Florida, Massachusetts, and Rhode Island have obtained authority to collect information for fuel emergencies. See Report at 27–28.
- 69 CGEP Forums; 2015 ESSP Section 4.1.
- 70 NPC Report, Chapter 4; 2015 ESSP Section 4.1.
- 71 Priority objectives include safe operation of facilities; fuel supply to facilitate pre-storm evacuation; fuel supply to emergency responders; limitation of storm damage by safe shutdown of facilities; safe evacuation of facility personnel; safe restart of facilities. NPC Report at 76. 2015 ESSP Section 4.1.
- 72 CGEP Forums; Hardening and Resiliency: US Energy Industry Response to Recent Hurricane Seasons, DOE (2010) (DOE Resiliency Report) at 25. Available at [www.oe.netl.doe.gov/docs/HR-Report-final-081710.pdf](http://www.oe.netl.doe.gov/docs/HR-Report-final-081710.pdf).
- 73 SMRNY at 141.
- 74 According to New York City, “duplicative efforts among different government entities to secure information further delayed diagnosis of the cause of the supply disruptions and resulted in conflicting reports and, at least initially, responses that did not properly address the issues.” SMRNY at 136. A related issue concerns the uneven coordination between relevant energy and emergency management officials at the state and federal levels. A prime example of the need for enhanced coordination relates to the conduct of DHS's Regional Resiliency Assessment Program (RRAP) for energy infrastructure and the need to coordinate assessments and share information with DOE. See US General Accountability Office Report 14–507: DHS Action Needed to Enhance Integration and Coordination of Vulnerability Assessment Efforts (2014) (GAO Report) at 69. Available at <http://www.gao.gov/assets/670/665788.pdf>; QER at 2–38. See Report at 28–29 and 47–49 for further discussion of the DHS RRAP program.
- 75 Communication with State of Massachusetts Department of Energy Resources (August 2015).
- 76 NYEEP at 2–4.
- 77 All Hazards Consortium. Available at <http://www.ahcusa.org/>
- 78 Regional Coordinating Councils bring together other established regional entities, such as the All Hazards Consortium, into a unified forum for coordination with various advisory bodies to DHS. DHS also funded the Regional Catastrophic Preparedness Grant Program, which resulted in the Regional Catastrophic Planning Team (RCPT). The RCPT included senior-level involvement from the New York City Office



- of Emergency Management, New York State, New Jersey, Connecticut, and Pennsylvania, but was recently disbanded due to lack of funding. See <http://www.regionalcatplanning.org/>.
- 79 NASEO is an association for the governor-designated energy officials from each of the fifty-six states and territories. Formed by the states in 1986, NASEO facilitates peer learning among state energy officials and serves as a resource for and about state energy offices, and advocates the interests of the state energy offices to Congress and federal agencies. See <http://www.naseo.org/>. Communications with NASEO (December 2015).
- 80 CGEP Forums; NYS 2100 Commission: Recommendations to Improve the Strength and Resilience of the Empire State's Infrastructure (2013) (2100 Commission Report) at 79; PSC Order Approving Electric Emergency Plans (8/16/13), Case 13-E-0198, In the Matter of 2013 Electric Emergency Plan Review (2013 PSC Order).
- 81 See Moreland Commission Report; Forums. See also Report at 29–31 for summary of actions by New York and New Jersey post-Sandy.
- 82 The PSC regulates electric utilities providing power to retail customers in New York State.
- 83 2013 PSC Order at 2.
- 84 New York State Petroleum Terminal Resiliency Assessment (2014), NYSERDA (NYPTRA), at 25–26, 51. Available at [nyserda.ny.gov/About/Publications/EA-Reports-and-Studies/Petroleum-Infrastructure-Studies](http://nyserda.ny.gov/About/Publications/EA-Reports-and-Studies/Petroleum-Infrastructure-Studies).
- 85 In response to Sandy and other extreme weather events that resulted in disruptions to the energy sector, Secretary of Energy Ernest Moniz called upon the National Petroleum Council (NPC) (a formal advisory body to the secretary whose membership primarily consists of the top 130 oil and gas production, midstream, and retail companies in the country) to undertake a study to identify ways to enhance energy sector resilience during emergencies. See [http://www.npc.org/reports/NPC\\_EmPrep\\_Report\\_2014-12-18.pdf](http://www.npc.org/reports/NPC_EmPrep_Report_2014-12-18.pdf).
- 86 NPC Report at 9–11. See also 2015 ESSP at 27 where DOE states: “improved situational awareness and its prerequisite of a resilient communications infrastructure are two key areas needed for strengthening Energy Sector resilience over the next ten years.”
- 86 NPC Report at 16.
- 86 NPC Report at 16.
- 87 Section 61001 of the FAST Act provides: “EMERGENCY PREPAREDNESS FOR NATURAL DISASTERS. The Secretary of Energy shall develop and adopt procedures to—
- (1) improve communication and coordination between the Department of Energy’s energy response team, Federal partners, and industry;
  - (2) leverage the Energy Information Administration’s subject matter expertise within the Department’s energy response team to improve supply chain situation assessments;
  - (3) establish company liaisons and direct communication with the Department’s energy response team to improve situation assessments;
  - (4) streamline and enhance processes for obtaining temporary regulatory relief to speed up emergency response and recovery;
  - (5) facilitate and increase engagement among States, the oil and natural gas industry, and the Department in developing State and local energy assurance plans;
  - (6) establish routine education and training programs for key government emergency response positions with the Department and States; and
  - (7) involve States and the oil and natural gas industry in comprehensive drill and exercise programs.
- (c) COOPERATION.—The activities carried out under subsection (b) shall include collaborative efforts with State and local government officials and the private sector;
- (d) REPORT.—Not later than 180 days after the date of enactment of this Act, the Secretary of Energy shall submit to Congress a report describing the effectiveness of the activities authorized under this section.” Available at <http://www.congress.gov/bill/114th-congress/house-bill/22/text>.
- 88 FAST Act Section 61001(a).
- 89 FAST Act Section 61001 (c).
- 90 See FEMA, “National Incident Management System,” <http://www.fema.gov/national-incident-management-system>.

- 91 NPC Report at 16. There is no description or definition of the “DOE energy response team” or the “DOE Situation Unit” in the NPC Report. A description of the ICS and the related NPC proposed structure for DOE is set forth in the NPC Report at 13–18, 36–42.
- 92 NPC Report at 16–19.
- 93 NPC Report at 16.
- 94 NPC Report at 14.
- 95 NPC Report at 40. As noted earlier, the NPC recommends that DOE standardize its emergency response function to be consistent with the National Response Framework. This includes adoption of the Incident Command System (ICS) communication protocol across DOE’s senior management and energy response teams. See NPC Report at 31–41.
- 96 NPC Report at 19. DOE began its state energy assurance planning (EAP) initiative pursuant to the 2009 American Recovery and Reinvestment Act of 2009, Public Law No. 111–5. EAPs serve as a voluntary resource for states to improve understanding of the energy sector as well as to plan and respond to energy emergencies. EAPs also focus beyond emergency response on longer-term system resiliency efforts. Guidelines for developing EAPs are provided by NASEO under the direction of DOE’s OE office; however, guidelines are broad. NASEO State Energy Planning Guidelines. Available at [naseo.org/Data/Sites/1/documents/publications/NASEO-State-Energy-Planning-Guidelines.pdf](http://naseo.org/Data/Sites/1/documents/publications/NASEO-State-Energy-Planning-Guidelines.pdf). The extent, complexity, and regional nature of energy infrastructure in each state varies considerably, which results in differences in how states conduct and use the EAP program.
- 97 NPC Report at 54.
- 98 Communications with API and with NASEO (July 2015).
- 99 QER at 2–39.
- 100 Communications with DOE, February 2016. See DOE FY 2016 Congressional Budget Request (2015), at 387–389. Available at [www.energy.gov/cfo/downloads/fy-2016-budget-justification](http://www.energy.gov/cfo/downloads/fy-2016-budget-justification). Senate Report 114–54 re Energy and Water Development Appropriations (May 21, 2015) at 78–79; House Report 144–91 re Energy and Water Development Appropriations (April 2015) at 91–92.
- 101 DOE FY 2017 Congressional Budget Request (February 2016) (FY 2017 CBR), at 389. Available at [www.energy.gov/cfo/downloads/fy-2017-budget-justification](http://www.energy.gov/cfo/downloads/fy-2017-budget-justification).
- 102 FY 2017 CBR at 389–391. Since Sandy, DOE has held tabletop exercises prior to hurricane seasons among public and private sector stakeholders. DOE Energy Emergency Preparedness Quarterly (Spring/Summer 2014). Available at [energy.gov/oe/services/energy-assurance/emergency-preparedness](http://energy.gov/oe/services/energy-assurance/emergency-preparedness).
- 103 CGEP Forums; NPC Report, Chapter 4; DOE Resiliency Report at 25; QER Appendix A at LF–56, where it is stated that several refinery and pipeline operators interviewed reported that they “maintain confidential hurricane preparedness plans.”
- 104 NPC Report Chapter 4.
- 105 NPC Report at 19.
- 106 NPC Report at 40. In commenting on the formal communication of information by companies to DOE, the NPC observes: “DOE will have a venue to validate their aggregated view of supply chain situation assessments.” See also NPC Report at 10.
- 107 It raises a variety of operational issues, including the effectiveness of loaning out EIA staff on a per-incident basis; how data would be evaluated and shared under emergency conditions; whether EIA has the appropriate authority for emergency response needs, given its “independent status” and prime function of providing sound statistical analyses to provide such assistance, and if so, what additional resources would be needed.
- 108 National Petroleum Council, “Members by Category, 2014–2015 Term,” <http://www.npc.org/members/byCatcon.html>. The 108 members of the NPC include the integrated refining and production companies, and midstream and retail companies.
- 109 See Appendix II of the Report for the current structure of the ERO.
- 110 DOE FY 2015 Congressional Budget Request (2014) (FY 2015 CBR) at 382. Available at [energy.gov/cfo/downloads/fy-2015-budget-justification](http://energy.gov/cfo/downloads/fy-2015-budget-justification).

- 111 Communications with DOE (February 2016). The ERO is generally overseen by DOE's Emergency and Incident Management Council (EIMC) created in 2013. The EIMC is headed by the DOE Deputy Secretary, meets periodically to facilitate cooperation and coordination across DOE senior leadership, and provides overall direction for DOE during emergencies. Communication with DOE (February 2016).
- 112 Communication with NASEO 7/20/15, and with DOE 2/5/16.
- 113 FY 2015 CBR at 386–387; FY 2016 CBR at 379, 392. Available at [energy.gov/cfo/downloads/fy-2016-budget-justification](http://energy.gov/cfo/downloads/fy-2016-budget-justification).
- 114 Senate Report 114–54 re Energy and Water Development Appropriations (May 2015) at 78–79; House Report 144–91 re Energy and Water Development Appropriations (April 2015) at 91–92.
- 115 FY 2017 CBR at 383–386, 388.
- 116 See Environment for the Analysis of Geo-Located Energy Information, US DOE, <https://eagle-i.doe.gov/Default.aspx>. EAGLE-I has two components: “a dashboard to provide real-time information to users to allow monitoring of the energy information and a mapper to display assets and components of energy infrastructure along with the real-time hazards.” 2015 ESSP at 30.
- 117 FY 2017 CBR at 383–384.
- 118 Communication with DOE (February 2016).
- 119 FY 2017 CBR at 813 (General Provisions—Department of Energy: Section 310. Consolidated Emergency Operations Center). Available at <http://www.whitehouse.gov/sites/default/files/omb/budget/fy2017/assets/doe.html>.
- 120 Communication with DOE (February 2016).
- 121 FY 2017 CBR at 801.
- 122 FY 2017 CBR at 797, 806.
- 123 See US Department of Homeland Security's “Regional Resiliency Assessment Program,” [http://www.dhs.gov/sites/default/files/publications/RRAP-Fact-Sheet-508\\_0.pdf](http://www.dhs.gov/sites/default/files/publications/RRAP-Fact-Sheet-508_0.pdf).
- 124 High-risk chemical facilities are required to develop vulnerability assessments as well as to develop and implement site security plans in accordance with risk-based performance standards for security issued by DHS. Homeland Security Appropriations Act of 2007, Public Law 109–295; DHS Chemical Facility Anti-Terrorism Standards Regulations, 6 CFR Part 27.
- 125 10/17/14 Forum.
- 126 Under the RRAP program, DHS has no authority to require owners and operators of critical infrastructure to provide access to their facilities; to provide information such as response plans; or to develop and implement resiliency improvements. Various communications with DHS.
- 127 10/17/14 Forum. Summary Available at <http://energypolicy.columbia.edu/on-the-record/summary-second-roundtable-resilience-liquid-fuel-supply-chain-new-york-tri-state-area>. DHS also runs the Enhanced Critical Infrastructure Protection Initiative (ECIP), which like the RRAP is voluntary. DHS Protective Security Advisors reach out to infrastructure owners and operators to provide security surveys, training and education, and recommendations for protective measures for particular facilities. See [dhs.gov/ecip](http://dhs.gov/ecip). Use of information developed in the RRAP and ECIP programs is in many cases restricted to qualified persons when it is denominated for official use only or as protected critical infrastructure information pursuant to the Critical Infrastructure Information Act of 2002 and implementing regulations. 6 CFR Part 29.
- 128 Various conversations and meetings with DHS RRAP team and Region 2 critical infrastructure protection team (2014–2015).
- 129 2100 Commission Report. <http://www.governor.ny.gov/assets/documents/NYS2100.pdf> at 38.
- 130 For additional initiatives (not exhaustive), see <https://www.governor.ny.gov/news/governor-cuomo-announces-broad-series-innovative-protections-vice-president-biden-credits>.

- 131 Communications with NYSERDA (June 2015; July 2015); <http://www.governor.ny.gov/news/governor-cuomo-announces-strategic-fuel-reserve-upstate-new-york-help-prepare-future-severe>.
- 132 Fuel NY requires strategic gas stations to install the wiring necessary so they can connect portable emergency generators in the event of an extended power outage due to an energy or fuel supply emergency, or install a permanently affixed backup power generator. New York has given grants to help offset the costs of these modifications, in addition to making available a pool of generators to be deployed by the state to gas stations during emergencies. See <http://stormrecovery.ny.gov/fuel-ny>. In June 2016 Governor Cuomo announced \$12 million available for grants for strategic retail gas stations in the downstate area to offset costs of purchasing and installing permanent emergency generators. [www.nyserda.ny.gov/About/newsroom/2016-Announcements/2016...3-Governor-Cuomo-Announces-12-Million-for-Downstate-Gas-Stations](http://www.nyserda.ny.gov/About/newsroom/2016-Announcements/2016...3-Governor-Cuomo-Announces-12-Million-for-Downstate-Gas-Stations).
- 133 Strategic gas stations are “within a half-mile of a controlled access highway exit or hurricane evacuation route in these downstate areas and are required to deploy generators within 24 hours of losing power in a declared energy or fuel supply emergency. Strategic stations also include certain real outlets that are part of a larger retail chain and located further than half-mile from controlled access highway exits and evacuation routes in the downstate area and are required to deploy and install a generator within 48 hours of losing power in a declared energy or fuel supply emergency.” See “Notice to Station Owners/Managers from NYS Department of Agriculture and Markets,” <http://nysandyhelp.ny.gov/fuel-ny>.
- 134 Each strategic station must file a form with the NYS Department of Agriculture and Markets (DAM) and document information regarding the station location, owner, plan for deployment of a generator, and transfer switch, and must provide an attestation from the electrician that the transfer switch was properly installed. DAM monitors compliance with the program and determines if any action is required, should a station fail to comply (see <http://nysandyhelp.ny.gov/fuel-ny>). In Florida, which has a similar backup power program for strategic stations, the state has contracted with a third party to survey the status of strategic stations prior to and during fuel emergencies, including operational status, inventories, and expected deliveries. Communication with Florida Division of Emergency Management (September 2015).
- 135 New York State Petroleum Terminal Resiliency Assessment, NYSERDA (2014). Available at <http://www.nyserda.ny.gov/About/Publications/EA-Reports-and-Studies/Petroleum-Infrastructure-Studies>).
- 136 The requirements were adopted post-Sandy in response to recommendations from the NYS Moreland Commission on Utility Storm Preparation and Response, established by Governor Cuomo. See NYS Public Service Law Section 66 (21)(a). <http://www.governor.ny.gov/assets/documents/MACfinalreportjune22.pdf>.
- 137 10/17/14 Forum. PSC Order Approving Electric Emergency Plans (March 28, 2014): Case 13-E-0550, In the Matter of the December 15, 2013, Electric Emergency Plan Review. Available at <http://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterCaseNo=13-E-0550&submit=Search+by+Case+Number>; PSC Order Approving Amended Emergency Plans (March 26, 2015): Case 14-E-0524, In the Matter of December 15, 2014, Electric Emergency Plan Review. Available at <http://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterCaseNo=14-E-0524&submit=Search+by+Case+Number>. Communication with DPS (December 2015).
- 138 See NYS Public Service Commission Press Release 2/5/15: PSC Approves Con Edison Storm Hardening Plans for 2015. Available at <http://www3.dps.ny.gov/pscweb/WebFileRoom.nsf/Web/3E4A1DE79B5D8D6285257DE3006F8AAF/File/pr15016.pdf?OpenElement>. Con Edison has been directed by the PSC to spend about \$468 million to improve resiliency of its distribution systems; and the Long Island Power Authority has adopted a \$730 million storm-hardening program which includes key substations and a new outage management system to monitor outages and improve communication with customers. [www.nyserda.ny.gov/About/Newsroom/2016-](http://www.nyserda.ny.gov/About/Newsroom/2016-)



Announcements/2016...3-Governor-Cuomo-Announces-12-Million-for-Downstate-Gas-Stations.”

- 139 Energy officials at the federal, state, and local levels are participating in this RRAP along with DHS, other emergency management officials, and the CGEP.
- 140 New Jersey Economic Development Authority, “Retail Fuel Station—Energy Resiliency Program,” [http://www.njeda.com/disaster\\_relief/retail\\_fuel\\_station](http://www.njeda.com/disaster_relief/retail_fuel_station). As of November 2015, according to the DNJMEP, this program has approved grants totaling \$3.6 million to gas stations for the reimbursement for the cost of forty-eight permanent generators and fifty-seven quick-connects. See New Jersey Energy Master Plan: [http://www.nj.gov/emp/docs/pdf/EMP\\_Update\\_For\\_Public\\_Comment\\_11-20-15.pdf](http://www.nj.gov/emp/docs/pdf/EMP_Update_For_Public_Comment_11-20-15.pdf).
- 141 New Jersey Energy Master Plan (December 2015) at 46–53. Available at [nj.gov/emp/docs/pdf/New\\_Jersey\\_Energy\\_Master\\_Plan\\_Update.pdf](http://nj.gov/emp/docs/pdf/New_Jersey_Energy_Master_Plan_Update.pdf).
- 142 Communication with PSE&G (November 2015); DNJMEP. ([http://www.nj.gov/emp/docs/pdf/EMP\\_Update\\_For\\_Public\\_Comment\\_11-20-15.pdf](http://www.nj.gov/emp/docs/pdf/EMP_Update_For_Public_Comment_11-20-15.pdf)). Also see New Jersey Board of Public Utilities Press Release (5/21/14): NJ Board of Public Utilities Approves \$1 Billion Energy Strong Storm Mitigation Plan Settlement with PSE&G. Available at [http://nj.gov/bpu/pdf/announcements/2014/Energy\\_Strong\\_BAM\\_5\\_21\\_14pr.pdf](http://nj.gov/bpu/pdf/announcements/2014/Energy_Strong_BAM_5_21_14pr.pdf).
- 143 NYC AAR.
- 144 See SMRNY Chapter 7 (Liquid Fuels) at 141–142.
- 145 See New York City Local Law 42 of 2012, codified at NYC Administrative Code Section 3–122 (New York City panel on climate change (PCC)) and 3–123 (New York City climate change adaptation task force (CCATF)). Available at [http://72.45.128.254/nyc/adcode/Title3C1\\_3-122.asp](http://72.45.128.254/nyc/adcode/Title3C1_3-122.asp) and [http://72.45.128.254/nyc/adcode/Title3C1\\_3-123.asp](http://72.45.128.254/nyc/adcode/Title3C1_3-123.asp). The PCC reviews data on climate change and advises ORR and the CCATF on potential impacts regarding a variety of matters, including critical infrastructure.
- 146 Participation on the task force is voluntary.
- 147 Developed from the “Sourcemap” platform, representatives from key agencies and fuel supply chain companies and facilities could voluntarily register to join and get access to FuelingNYC. Registered users were asked to provide key emergency contact information. Users could communicate with each other (e.g., private sector could communicate operational status and other details, as well as request assistance from public sector on issues such as regulatory relief during emergencies) and receive alerts via e-mail and text during nonemergency and emergency conditions. The effectiveness and utility of the platform are dependent upon the number of registered participants, in particular from the private sector. Communication with NYCEDC (2015).
- 148 NPC Report at 19.
- 149 NEMA was established in 1974 and is the professional association of and for emergency management directors from all fifty states, eight US territories, and the District of Columbia. NEMA provides national leadership and expertise in comprehensive emergency management; serves as a vital emergency management information and assistance resource; and advances continuous improvement in emergency management through strategic partnerships, innovative programs, and collaborative policy positions. See <http://www.nemaweb.org/>.
- 150 The FS MOU provides in part that (1) participating states and DOE will on a voluntary basis develop, maintain, and distribute a contact list of state and federal officials responsible for energy market monitoring, consequence assessment, and emergency response; (2) states will provide timely assessments of energy markets in the event of a supply disruption to surrounding states and DOE (via restricted websites, e-mail lists, and conference calls); (3) DOE will provide to states any indicators that suggest potential for supply disruption; during an actual disruption, DOE will provide states any information that would help assess the severity, scope, and consequences of the disruption and any federal action taken; and 4) the communication system will “be tested and evaluated by DOE and states every two years.” FS MOU at 1. Available at [naseo.org/news](http://naseo.org/news).
- 151 NIPP 2013: Partnering for Critical Infrastructure Security and Resilience, DHS (2013) (2013 NIPP) at 21, 23–24. Available at [dhs.gov/national-infrastructure-protection-plan](http://dhs.gov/national-infrastructure-protection-plan). See also NPC Report at 9–11; 2015 ESSP at 27.
- 152 Rhode Island Energy Resources Act, Chapter 42–140, Section 42–140–10, [www.rilin.state.ri.us/Statutes/TITLE\\_42/42-140/42-140-10.HTM](http://www.rilin.state.ri.us/Statutes/TITLE_42/42-140/42-140-10.HTM).
- 153 15 USC Section 796(d); 45 USC Section 7135(g); 18 USC Section 1905.
- 154 NPC Report at 20–21.



- 155 NPC Report at 21.
- 156 NPC Report at 21.
- 157 CGEP Forums.
- 158 NPC Report at 12, 18–19. The NPC, ONG SCC, and major petroleum sector trade associations, as well as NASEO and NARUC, could be very useful in this effort.
- 159 The importance of identifying critical energy infrastructure to address growing threats to reliability of the energy sector is illustrated by Congress’s recent authorization of the Secretary of Energy to identify “critical electric infrastructure” (CEI) in connection with developing procedures to address growing threats to the reliability of the bulk power grid. See FAST Act, Section 61003 (Critical Electric Infrastructure Security). CEI is broadly defined to include “a system or asset of the bulk power system, whether physical or virtual, the incapacity or destruction of which would negatively affect national security, economic security, public health or safety, or any combination of such matters.” FAST Act, Section 61003 (a)(2).
- 160 <https://www.eia.gov/analysis/transportationfuels/padd5/>; PADDs 1 and 3 Transportation Fuels Markets (February 2016), report prepared for EIA by ICF International. Available at [eia.gov/analysis/transportationfuels/padd1n3/](http://www.eia.gov/analysis/transportationfuels/padd1n3/).
- 161 See EIA Energy Disruption Maps for an example: <http://www.eia.gov/special/disruptions>; EIA State Profiles: [www.eia.gov/states](http://www.eia.gov/states). The National Pipeline Mapping System. Available at [www.npms.phmsa.dot.gov](http://www.npms.phmsa.dot.gov). Private sources may also be available such as Genscape (<http://www.genscape.com/>); ClipperData (<http://clipperdata.com/>); Opis Petroleum Bulk Terminals Directory ([www.opisnet.com/products/liquid-terminals-directory.aspx](http://www.opisnet.com/products/liquid-terminals-directory.aspx)). Information is also available for authorized users from the DHS RRAP and ECIP programs.
- 162 An issue that requires clarification in this connection is, what if public sector officials have authority to direct vessels to particular ports and docking facilities during an emergency to allocate needed supplies? The coast guard has broad authority to direct vessels based on safety, environmental, and security concerns, and can grant waivers from areas closed to traffic owing to hazardous conditions under certain circumstances. See API Handbook at 31; 33 CFR Chapter 1, Subchapter P, Part 160, Subpart B.
- 163 To facilitate this, the public sector should establish clear lines of responsibility for energy (fuel) sector emergency preparedness and response functions in coordination with emergency management officials at each governmental level. This is further discussed as part of Recommendation 6 at 46–47 of the Report. Similar actions are provided for in the FS MOU discussed in footnote 152 of the Report.
- 164 Some progress has been made in this area. For example, in implementing a mandatory emergency generator program, New York has identified by owner/operator and physical location strategic gas stations and developed a map showing their locations. Similar difficulties in tracking marine supply chains are presented by the variety of vessels and shippers. In terms of tracking marine transport, the coast guard’s Marine Transportation System Recovery Unit for New York Harbor likely would be a useful resource. Port Recovery in the Aftermath of Sandy--Improving Port Resiliency in the Era of Climate Change (August 2014), Center for New American Security at 8,15,18-19. Available at: [cnas.org/sites/default/files/publications-pdf/CNAS\\_HurricaneSandy\\_Voices\\_from\\_the\\_Field.pdf](http://cnas.org/sites/default/files/publications-pdf/CNAS_HurricaneSandy_Voices_from_the_Field.pdf).
- 165 NYCAAR at 23.
- 166 Communication with API (July 2015).
- 167 According to NYSERDA, there are about fifty primary distributors in the New York downstate region. Communications with NYSERDA (July 2014; November 2015).
- 168 As discussed on pages 29-30 of the Report, this program mandates backup power capability for strategic retail gas stations. Each strategic station must file a form with the NYS Department of Agriculture and Markets (DAM) and provide the location, owner, and phone and e-mail contact information during emergency conditions. DAM seeks to monitor compliance with the program (see <http://nysandyhelp.ny.gov/fuel-ny>). In Florida, which has a similar backup power program for strategic stations, the state has contracted with a third party to survey the status of strategic stations prior to and during fuel emergencies including operational status, inventories, and expected deliveries. Communication with Florida Division of Emergency Management (September 2015).
- 169 SMRNY at 134, noting that 500 out of the ~800 gas stations (over 60 percent) located in New York City are associated with seven major brands. If these branded stations are owned by chains or franchisees, this could reduce the necessary number of contacts for critical information.

- 170 In this context, “real time” does not mean minute-by-minute reporting of fuel flows nor is it intended to imply installation of continuous monitoring equipment; rather it generally refers to daily (or possibly more or less frequently depending on circumstances) reports of the best current information available to facility operators on the operational status and capacity of a facility, expected fuel supplies, and time for restoration to normal operations, including at a minimum the data available to and monitored by the facility at the time of reporting.
- 171 To increase resiliency of the liquid fuels system, New York City recommended developing “a reporting framework for fuel infrastructure operators to support post-emergency restoration,” including “work[ing] with the Federal government and private industry to develop streamlined reporting protocols for operators, as well as automated sensors and other information technology systems that will monitor the operational status of these facilities.” SMRNY at 141.
- 172 CGEP Forums. DOE Overview at 10. According to the NPC Report, “It is critically important for government emergency response organizations to have a baseline understanding of the dynamic nature of the oil and gas supply chains.” NPC Report at 9.
- 173 EIA’s surveys are not designed for real-time monitoring of operational status for specific facilities, supply chains, and distribution channels. Some of EIA’s existing data collected for the fuel sector may be useful to generate a baseline comparison, such as surveys regarding historical inventory levels at terminals and pipeline deliveries; monthly report of prime supplier sales of petroleum products sold for local consumption; monthly tanker and barge movements report. However, as earlier noted, EIA is not currently structured for emergency response and real-time monitoring of critical fuels infrastructure. Other potential sources of baseline information include general media and trade press reports, company reports, and various commercial options such as Genscape and Reuters.
- 174 DOE Overview at 7, 10.
- 175 SMRNY at 126.
- 176 See Form EIA–930, “Balancing Authority Operations Report.” Available at [eia.gov/survey](http://eia.gov/survey). EIA has recently proposed to require reporting of daily net generation every thirty minutes rather than hourly. See EIA Proposed Changes to Electricity and Renewable (Photovoltaic) Survey Forms (November 2015). These entities include the New York Independent System Operator and PJM.
- 177 EIA Supporting Statement for Survey Clearance: Electric Power and Renewable Electricity Surveys (OMB Number 1905–0129) (December 5, 2013) at 21–22. Available at [eia.gov/survey/changes/electricity/part-a.pdf](http://eia.gov/survey/changes/electricity/part-a.pdf). See Form EIA–930. The data collected by EIA does not directly report net generation by individual utilities or service zones in states, although there are proposals to collect the data on a more local basis. Communication with EIA (January 2016). The data monitored by OE with EAGLE-I does relate to particular electrical distribution equipment. Communication with DOE (February 2016).
- 178 Form EIA–20, which expires July 31, 2017. Available at [eia.gov/survey](http://eia.gov/survey).
- 179 Form EIA–20. Available at [eia.gov/survey](http://eia.gov/survey).
- 180 Form OE–417 Electric Emergency Incident and Disturbance Report, which expires March 31, 2018. Available at [eia.gov/survey](http://eia.gov/survey).
- 181 See Form OE–417.1 Available at [eia.gov/survey](http://eia.gov/survey). Specifically it requires electric utilities to report fuel “supply emergencies that could impact electric power system adequacy or reliability” within six hours of the incident.
- 182 Electric utilities in New York are required to establish outreach and communication channels with critical fuel sector customers, and report outages to the NYS Department of Public Service (DPS). NYS Public Service Law, Section 66(21)(a). They also report outage information to the NYS Emergency Operations Center overseen by the NYS Division of Homeland Security and Emergency Services. However, electric utilities in New York have not installed electronic systems to monitor real-time operational status of customers. Some utilities in New York have proposed installing Advanced Metering Infrastructure (AMI), which can include real-time sensors, power outage notification, and power quality monitoring via two-way communication, but the PSC has not approved these systems to date. Communication with DPS (December 2015). Public Service Electric & Gas (PSE&G) in New Jersey also does not have AMI. Communication with PSE&G (November 2015).
- 183 DOE Overview at 7. DOE concluded in its overview of its response to Sandy that “some of the major areas where

- improvement is needed is in availability of information of energy supplies and communication of restoration schedules. . . 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.” See SMRNY and Report at 20-21.
- 184 E.g., Genscape, <http://www.genscape.com/>.
- 185 EIA conducted this type of investigation in developing the requirement for balancing authorities to report hourly net generation of electricity. See Form EIA-930 at 22–24. Available at [eis.gov/survey](http://eis.gov/survey).
- 186 In New York, petroleum terminals with 400,000 barrels or more of capacity are required to report average annual throughput and total capacity of the facility (in gallons) to the Department of Environmental Conservation (NYDEC) in connection with petroleum spill regulations. NYDEC Application for Major Petroleum Facility License pursuant to New York Navigation Law, Article 12, and implementing regulations at 6 NYCRR Part 610 and 17 NYCRR Part 30.
- 187 Florida’s Division of Emergency Management collects this data in addition to data on inventories and operational status from individual terminals via a secure electronic portal. It does not collect price or baseline information. Communication with Florida Division of Emergency Management (September 2015).
- 188 See NPC Report at 10–11, where the NPC cites the PWRA procedures as one reason that EIA lacked the operational capacity to fully assist in providing situational awareness during Sandy.
- 189 In the past, EIA has obtained OMB approval to collect information to address emergency conditions, including during Sandy. Report at 16. Industry could continue to report to EIA through its secure reporting platform, PEDRO, which is currently used by industry to respond to existing reporting requirements. See [eia.gov/survey/form/pedro](http://eia.gov/survey/form/pedro).
- 190 EIA has the authority to do so. See Section 205(f) of the Department of Energy Organization Act, 42 USC Section 7101.
- 191 EIA has authority to share information in this manner. See Federal Energy Administration Act, Section 13(b), 15 USC Section 772(b).
- 192 EIA has authority to share company-specific information with states under certain conditions. See Section 805(c) of the Energy Independence and Security Act of 2007, Public Law 110–140.
- 193 The National Nuclear Security Administration within DOE—not ISER—is responsible for emergency response involving nuclear materials. See footnote 219.
- 194 Such consultation should include, for example, supply chain dynamics and operations, operational aspects, capacities and vulnerabilities of critical infrastructure, and response/recovery options.
- 195 As noted earlier, OE has issued mandatory emergency reporting requests. See Form OE-417 Electric Emergency Incident and Disturbance Report requiring electric utilities to report matters having a critical impact on operations, including a fuel supply deficiency. Available at [eia.gov/survey](http://eia.gov/survey).
- 196 FAST Act, Section 61003(d) (Protection and Sharing of Critical Electric Infrastructure Information), which adds a new Section 215A to the Federal Power Act ( 16 USC 824 et seq.).
- 197 Section 5–117 of the New York State Energy Law authorizes the governor to declare an energy or fuel emergency for up to six months. If this occurs, NYSERDA is authorized, among other things, to allocate “available supplies of energy or energy resources among areas, users, persons, or categories of persons or users” and to promulgate rules and regulations to implement this authority prior to an emergency that would be triggered by an emergency declaration. See New York State Executive Law, Article 2, Section 11(Fuel and Energy Shortage State of Emergency).
- 198 Petroleum Industry Information Reporting Act, [www.energy.ca.gov/piira](http://www.energy.ca.gov/piira); Florida Statutes Title XXVIII, Chapter 377, Section 377.701 (Petroleum Allocation); Massachusetts General Laws Section 25A, Section 7; Rhode Island Energy Resources Act, Chapter 42–140, Section 42–140–10, [www.rilin.state.ri.us/Statutes/TITLE\\_42/42-140/42-140-10](http://www.rilin.state.ri.us/Statutes/TITLE_42/42-140/42-140-10), HTM-42-140-10-. In Florida, information reported is provided to the governor in aggregated form. Access to company-specific data is limited to the director of the state emergency response team, and only provided to other officials, such as persons responsible for securing fuel for first responders, on a need-to-know basis. Communication with Florida Division of Emergency Management (September 2015).

- 199 Another option at the federal level for protecting sensitive information could be to classify it as PCII (Protected Critical Infrastructure Information) under the DHS critical infrastructure protection program, which requires users to undergo annual training and certification in order to view PCII-protected data. <http://www.dhs.gov/protected-critical-infrastructure-information-pcii-program>.
- 200 The California Energy Commission (CEC) collects baseline information using forms and surveys. During emergencies, the CEC contacts managers of critical infrastructure by phone and/or e-mail and requests information as needed, e.g., operational status, damage to key facilities, such as control centers, truck racks, estimated restoration time, status of power and water supplies, lost product. Owing in part to resource constraints, CEC has not to date established a formal, secure means for gathering information during fuel emergencies. Communication with California Energy Commission (September 2015).
- 201 NYS Senate Bill 7210 (an act to amend the energy law in relation to registration and reporting by major petroleum suppliers and pipeline operators), introduced April 6, 2016, by Senator Joseph Griffo (SB 7210). Available at [nysenate.gov/legislation/bills/2015/s7210/amendment/original](http://nysenate.gov/legislation/bills/2015/s7210/amendment/original). Assembly Bill 9571, introduced March 17, 2016, by Assemblyman Paulin. Available at [nysenate.gov/legislation/Bills/2015/A9571/amendment/original](http://nysenate.gov/legislation/Bills/2015/A9571/amendment/original). Information as to inventories at and suppliers of major petroleum terminals can also be obtained by NYSERDA from the New York State Department of Environmental Conservation, which collects this data under its oil spill prevention and control program. See DEC Monthly Petroleum License Fee Monthly Report and Major Petroleum Storage Facility Schedule of Deliveries. Available at [dec.ny.gov/chemical/4767.html](http://dec.ny.gov/chemical/4767.html). Forms and Instructions for the Bulk Storage Program-NYS Dept. of Environmental Conservation.
- 202 SB 7210 Section 13–109. “New York State Entity” is not defined but should include relevant local authorities as well as state authorities. See Appendix III of the Report for a copy of SB 7210.
- 203 Bill Sponsor Memo. Available at [nysenate.gov/legislation/bills/2015/s7210/amendment/original](http://nysenate.gov/legislation/bills/2015/s7210/amendment/original).
- 204 DOE Overview at 10
- 205 NPC Report at 12–13, 16.
- 206 NPC Report, Figure 3–4 at 68. API Handbook at 23.
- 207 NPC Report at 16, 18.
- 208 NASEO has recommended that it, in consultation with DOE and ONG SCC, develop guidance for compliance with antitrust laws and appropriate protection of proprietary information for states by June 30, 2016, as one task to facilitate implementation of the NPC recommendations. Communication with NASEO (December 2015).
- 209 Communication with NYSERDA (April 2016).
- 210 In Texas, a senior executive from the fuel industry is appointed as the state fuel coordinator who assembles a voluntary industry fuel team that develops an emergency operations fuel plan and is stationed in the state operations center during emergencies to advise the state emergency team as to fuel availability and delivery. See Texas Executive Order RP57. Available at <http://www.txdps.state.tx.us/dem/GrantsResources/execorders.pdf>. State of Texas Emergency Management Plan, Appendix 1 Hurricane Annex (revised August 2011, updated March 14, 2013). Available at [http://www.txdps.state.tx.us/documents/planState.state\\_plan.pdf](http://www.txdps.state.tx.us/documents/planState.state_plan.pdf). Communication with Texas Oil and Gas Association (July 2014).
- 211 State of Louisiana Department of Natural Resources, “Louisiana Fuel Team and Playbook,” <http://dnr.louisiana.gov/index.cfm?md=pagebuilder&tmp=home&pid=786&pn:Coid=0&nid=329>. The LA Fuel Team overseen by LA Department of Natural Resources, includes representatives from the refinery and supply sector, the supply and terminal sector, and the retail fuel and tank truck sectors. The LA Fuel Team has also created a database and map showing fuel availability at gas stations on evacuation routes provided by stations that participate voluntarily, similar to what NYSERDA and NYDAM have done for strategic gas stations.
- 212 NPC Report at 16. Texas has a Private Sector Advisory Council, including energy industry representatives, that advises the governor or the governor’s designee on homeland security issues, including infrastructure protection. Texas Code Chapter 421, Section 421.042.
- 213 Communication with DOE (January and February 2016). DOE FY 2016 CBR at 379. The House Appropriations Committee in its report on DOE’s FY 2016 budget request concluded: “It is the Committee’s understanding that the Department has chosen not to build out this Operations Center” and requested DOE to provide a report on plans “for meeting the requirement for a functional Operations Center.” House Appropriations Committee Report 144–91 (April 21, 2015) at 91–92.



- 214 In May 2015, the Senate Appropriations Committee in reviewing DOE's FY 2016 budget request noted that the construction of the proposed EOC had been delayed since ISER "is now engaged in a joint effort with the National Nuclear Security Administration..." See Senate Report 114-54 (May 21, 2015) at 78-79.
- 215 Currently NNSA has responsibility for the security of the nation's nuclear weapons, nuclear nonproliferation and naval reactor programs, and response to nuclear and radiological emergencies. See [nnsa.energy.gov](http://nnsa.energy.gov); National Nuclear Security Administration Act (NNSAA). 42 USC Section 7132.
- 216 50 USC Section 2481(b).
- 217 CGEP Forums; NPC Report at 10-11, 18; DOE Overview at 7-8, 10; FS MOU.
- 218 According to the NPC, "To sustain an effective emergency preparation and response process, DOE's emergency preparedness and response program needs to have an assigned process owner." NPC Report at 18.
- 219 For example, during Sandy, FEMA, at the President's direction set up an Energy Restoration Task Force that coordinated fuel allocations, among other tasks. See FEMA Hurricane Sandy After-Action Report. Available at [http://www.fema.gov/media-library-data/20130726-1923-25045-7442/sandy\\_fema\\_aar.pdf](http://www.fema.gov/media-library-data/20130726-1923-25045-7442/sandy_fema_aar.pdf).
- 220 The ONG SCC could be helpful in these efforts. NPC Report at 16, 19-22.
- 221 New York State includes officials with knowledge of the fuel sector within its Critical Infrastructure and Key Resources team, which includes energy, transportation, and other agencies that have oversight over critical infrastructure, and serves to share information and develop strategy in the Emergency Operations Center. Communication with NYSERDA (April 2016).
- 222 For examples of best practices, see DOE Resiliency Report; QER Appendix A at 54-63; NYPTRA at 32-46; Sector Resilience Report: Electric Power Delivery (June 11, 2014), DHS. Available at [scadahacker.com/library/Documents/Threat\\_Intelligence/DHS%20-%20Sector%20Resilience%20Report%20Electric%20Power%20Delivery%20%2014%20July%202014.pdf](http://scadahacker.com/library/Documents/Threat_Intelligence/DHS%20-%20Sector%20Resilience%20Report%20Electric%20Power%20Delivery%20%2014%20July%202014.pdf). NPC Report at 54-55. USFR III at 53-55, 97. For examples of resilience metrics, see Resilience Metrics (April 28, 2014), Argonne National Laboratory, prepared for QER; Conceptual Framework for Developing Resilience Metrics for the Electricity, Oil and Gas Sectors in the United States (September 2014), prepared by Sandia National Laboratories for the QER. Available at [energy.gov/epa/qer-document-library](http://energy.gov/epa/qer-document-library). See also "United States Fuel Resiliency, Final Report (September 2014)," prepared for DOE Office of Energy Policy and Systems Analysis by INTEK Inc.; Measuring the Resilience of Energy Distribution Systems (2015), prepared by Rand Corporation for the DOE Office of Energy Policy and Systems Analysis; and Simulating Impacts of Disruptions to Liquid Fuels Infrastructure (April 2015), prepared by Sandia National Laboratories for DOE. Available at [energy.gov/epa/qer-document-library](http://energy.gov/epa/qer-document-library). See also Florida Statutes, Alternate Generated Power, Chapter 526.143, which requires certain petroleum terminals to install backup power generation or capability to connect to emergency generators.
- 223 In September 2014 DOE observed: "Assessments in the energy sector, for example, should be coordinated with SSA (DOE) and all relevant data that is used by DHS should be shared with DOE at the conclusion of any engagements involving industry." GAO Report at 69 (emphasis added). Similarly, in 2015 the QER recommended increasing coordination and engagement with DHS with respect to energy infrastructure as follows: "DOE, in collaboration with DHS and interested infrastructure stakeholders, should develop common analytical frameworks, tools, and metrics to assess the resilience, reliability, and security of energy infrastructures. The purpose of this work will be to help inform, coordinate, set priorities for, and justify expenditures across Federal agencies to increase the resilience, reliability, and security of energy infrastructure." QER at 2-38.
- 224 In conducting the QER, DOE had Argonne National Laboratory analyze data collected by DHS in the ECIP program from 273 energy facilities (170 electricity, 45 liquid fuels, and 15 natural gas) from January 2011 to September 2014 "to identify gaps in preparedness and rapid recovery measures" at said facilities. QER at LF 57.
- 225 See Report at 19 for a list of other regional energy infrastructure RRAPs conducted by DHS.
- 226 See Report at 20.
- 227 Congress recently directed the Secretary of Energy to develop a plan to "to establish a Strategic Transformer Reserve for the storage, in strategic located facilities, of spare large power transformers and emergency mobile substations..." FAST Act, Section 61004(c).



- 228 NYS 2100 Commission Report at 90–91.
- 229 NPC Report at 18.
- 230 “Security programs and emergency response planning are most effective when stakeholders clearly understand their respective roles and responsibilities and plan to integrate their independently executed roles to achieve a common set of infrastructure protection outcomes.” NPC Report at 55 and Chapter 3.
- 231 NYPTRA at 47–49 for examples of information in these plans.
- 232 NPC Report at 19. DOE Overview at 11.
- 233 Private exchanges of fuels by distributors in different locations are not uncommon and often can lower the transportation costs of the participants. Buckeye Partners, LP 2014 Annual Report (BP AR) at 10. Available at [buckeye.com/InvestorCenter/tabid/84/Default.aspx](http://buckeye.com/InvestorCenter/tabid/84/Default.aspx). NPC Report at 19.
- 234 BP AR at 13–15; New York State Department of Environmental Conservation Regulations for Major Petroleum Facilities: 6 NYCRR Part 610, and 17 NYCRR Part 30.
- 235 See also Report at 20.
- 236 Memorandum of Understanding to protect the Bi-State region from terrorist threats and acts of terrorism and to enhance preparedness and response efforts should an attack occur (September 24, 2014). Available at <https://www.governor.ny.gov/news/governors-cuomo-and-christie-sign-bi-state-memorandum-understanding-increase-security-0>. The MOU provides for establishment of a joint working group to adopt protocols for communication and response, conduct joint planning and exercises, and a goal of “shared situational awareness.”
- 237 Strategies for States in Energy Assurance Planning: Regional Coordination and Communication (March 2013), NASEO. Available at [naseo.org/publications-Publications/NASEO](http://naseo.org/publications-Publications/NASEO) (NASEO Guidance).
- 238 NASEO Guidance.
- 239 NYS 2100 Commission Report at 38. See also NIPP 2013 at 13–14; 22–23 (regional partnerships are critical to effective protection of critical infrastructure).
- 240 DOE Overview at 11.
- 241 Letter from NASEO Executive Director David Terry to DOE Secretary Moniz (1/29/15) at 2.
- 242 US Office of Electricity and Energy Reliability, “Emergency Preparedness,” <http://energy.gov/oe/services/energy-assurance/emergency-preparedness>.
- 243 Report at 17–18. FY 2017 CBR at 390.
- 244 Report at 17–18; FY 2016 CBR at 378–79, 388; FY 2017 CBR at 390.
- 245 See QER, Appendix A at 57.
- 246 NYS 2100 Commission Report at 87–88.
- 247 PADDs 1 and 3 Transportation Fuels Markets (February 2016), prepared for EIA by ICF International (PADDs 1&3 Report), at 3–8. Available at [eia.gov/analysis/transportationfuels/padd1n3/](http://eia.gov/analysis/transportationfuels/padd1n3/).
- 248 Communication with NYSERDA (February 2016).
- 249 See Figure 1 of the Report at 38. SMRNY at 141; NYPTRA at 10–11; Figure 1 of Report at 38 EIA, New York/New Jersey Intra Harbor Petroleum Supplies Following Hurricane Sandy: Summary of Impacts through November 13, 2012 (NYNJ Harbor Survey). Available at [https://www.eia.gov/special/disruptions/hurricane/sandy/petroleum\\_terminal\\_survey.cfm](https://www.eia.gov/special/disruptions/hurricane/sandy/petroleum_terminal_survey.cfm). EIA State Profiles for New York and New Jersey. Available at [eia.gov/state](http://eia.gov/state). 2100 Commission Report at 90, Figure E–09. PADDs 1&3 Report at 47–50. Deliveries to Upstate New York markets are primarily via the Buckeye Pipeline (beginning in Linden but pumped to upstate terminals in Binghamton, Syracuse, Utica, Rochester, and Buffalo) and via the United Refinery in Western Pennsylvania, in addition to Canadian imports. PADDs 1&3 Report, at 52–53.
- 250 PNYNJ is governed by a bi-state entity, the Port Authority of New York and New Jersey. [www.panynj.gov](http://www.panynj.gov). In total, storage terminals located in PNYNJ have bulk storage capacity of over 75 million barrels. See <http://www.eia.gov/state/analysis.cfm?sid=NY>. NYNJ Harbor Survey; PADDs 1&3 Report at 48. Total pipeline capacity into PNYNJ is about 1.2 million barrels per day. PADDs 1&3 Report at 52. For a brief description of PNYNJ, see [https://en.wikipedia.org/wiki/Port\\_of\\_New\\_York\\_and\\_New\\_Jersey](https://en.wikipedia.org/wiki/Port_of_New_York_and_New_Jersey).

- 251 SMRNY at 134; United States Fuel Resiliency: Volume I, US Fuels Supply Infrastructure (September 2014), prepared for DOE by INTEK Inc. USFR I at 45–48. Available at [energy.gov/epsa/qer-document-library](http://energy.gov/epsa/qer-document-library). PADDs 1&3 Report at 52.
- 252 Reuters, “Insight: Sandy Gives New York Oil Supply Lesson” (Supply Lesson) (November 27, 2012). Available at <http://www.reuters.com/article/2012/11/27/storm-sandy-harbor-oil-idUSL1E8MR1BO20121127>.
- 253 All information discussed in this section is open source.
- 254 PADDs 1&3 Report at 45; SMRNY at 136. The Hess Corp. 70,000 b/d refinery operating in Port Reading, New Jersey, during Sandy, was closed in 2013.
- 255 Reuters, “Insight: Sandy Gives New York Oil Supply Lesson” (November 27, 2012). Available at <http://www.reuters.com/article/2012/11/27/storm-sandy-harbor-oil-idUSL1E8MR1BO20121127>. USFR I at 45–48; PADDs 1&3 Report at 50–51.
- 256 Buckeye Partners, LP 2014 Annual Report at 4. Available at [buckeye.com/InvestorCenter/tabid/84/Default.aspx](http://buckeye.com/InvestorCenter/tabid/84/Default.aspx). USFR I at 48; PADDs 1&3 Report at 51; SMRNY at 134.
- 257 Calculation based on data (NY Terminal Data Base) provided by ICF International, ([www.icfi.com](http://www.icfi.com)) sourced from OPIS/Stalsby Terminal Encyclopedia. Available at <http://www.opisnet.com/products/liquid-terminals-directory.aspx>.
- 258 NYNJ Harbor Survey at 2.
- 259 Communication with ClipperData (October 2015).
- 260 Center for a New American Security: Port Recovery in the Aftermath of Hurricane Sandy—Improving Port Resiliency in the Era of Climate Change (August 2014) (Port Recovery) at 6. Available at [cnas.org/sites/default/files/publications-pdf/CNAS\\_HurricaneSandy\\_VoicesFromTheField.pdf](http://cnas.org/sites/default/files/publications-pdf/CNAS_HurricaneSandy_VoicesFromTheField.pdf).
- 261 Communication with ClipperData (October 2015).
- 262 Supply Lesson.
- 263 Communication with ClipperData (October 2015).
- 264 Based upon membership information from Empire State Energy Association (<http://www.esenergy.org/aboutESEEA.php>) and Fuel Merchants Association of New Jersey (<http://www.fmanj.org>). NYSERDA estimates that there are fifty distributors in Downstate New York. Communication with NYSERDA (October 2015).
- 265 SMRNY at 134. These 800 gas stations have a combined storage capacity of 14.6 million gallons in underground storage tanks (about 3–4 days of supply assuming full tanks). Communication with NYSERDA (October 2015).
- 266 Communication with New Jersey Department of Environmental Protection (June 2015).
- 267 Patterns and Trends—New York State Energy Profiles: 1999–2013, Appendix C, Estimated Gasoline Sales by County in New York State, 2011–2013. <http://www.nyserda.ny.gov/About/Publications/EA-Reports-and-Studies/Patterns-and-Trends>. Following Sandy, New York City estimated average daily use for vehicles in the city as 3.4 million gallons of diesel fuel and gasoline; 6 million gallons of jet fuel (for the three area airports); and up to 6.6 million gallons of heating oil on the coldest days (for about 10,000 buildings). SMRNY at 133.
- 268 SMRNY at 136–39; NYPTRA at 20–31; NYNJ Harbor Survey; QER Appendix A at 63.
- 269 For deliveries (outflows), gasoline was at 72 percent, distillate at 56 percent, and jet/ethanol/other at 20 percent of pre-storm levels, based upon voluntary survey that included terminals accounting for 98 percent of storage capacity. NYNJ Harbor Survey at 2.
- 270 Reuters, republished by Fox Business. <http://www.foxbusiness.com/industries/2012/10/29/two-thirds-ecoast-refiners-shutting-as-hurricane-sandy-nears/>.
- 271 Energy Information Administration (EIA): <http://www.eia.gov/petroleum/weekly/archive/2012/121102/twiprint.html>. Chicago Tribune: [http://articles.chicagotribune.com/2012-10-30/news/sns-rt-storm-sandyenergy-factbox11e8lu1h9-20121030\\_1\\_philadelphia-energy-philadelphia-pbf-energy-paulsboro-monroe-energy-trainer](http://articles.chicagotribune.com/2012-10-30/news/sns-rt-storm-sandyenergy-factbox11e8lu1h9-20121030_1_philadelphia-energy-philadelphia-pbf-energy-paulsboro-monroe-energy-trainer). Stronger, More Resilient New York at 136.
- 272 SMRNY at 136.
- 273 Buckeye Partners Press Release (11/3/2012). Available at <http://www.buckeye.com/LinkClick.aspx?fileticket=Vpkvtxnyk9s=&tabid=36>.

274 Port Recovery at 8–14.

275 Port Recovery at 12.

276 United States Fuel Resiliency: Volume II, Vulnerability to Natural and Physical Threats (September 2014), prepared for DOE by INTEK, Inc. at 147–48. Available at [energy.gov/epsa/qer-document-library](http://energy.gov/epsa/qer-document-library).

277 Reuters, “Factbox: NY Harbor Oil Terminals, Refineries Crippled by Sandy” (November 11, 2012). Available at <http://www.reuters.com/article/2012/11/11/us-storm-sandy-energy-idUSBRE8AA0IP20121111>.

278 10/17/14 Forum; DOE Situation Reports ([http://www.oe.netl.doe.gov/named\\_event.aspx?ID=67](http://www.oe.netl.doe.gov/named_event.aspx?ID=67)) indicated that fifty-seven terminals reported on their status in the immediate aftermath of the storm.

279 SMRNY at 137.

280 EIA: Hurricane Sandy New York City Metropolitan Area Retail Motor Gasoline Supply Report (November 9, 2010). [http://www.eia.gov/special/disruptions/hurricane/sandy/gasoline\\_updates.cfm](http://www.eia.gov/special/disruptions/hurricane/sandy/gasoline_updates.cfm).

281 Reuters, “Factbox: NY Harbor Oil Terminals, Refineries Crippled by Sandy” (November 11, 2012). Available at <http://www.reuters.com/article/2012/11/11/us-storm-sandy-energy-idUSBRE8AA0IP20121111>.





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