

WHAT WE TALK ABOUT WHEN WE TALK ABOUT RESILIENCE

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Synopsis: Concern over electric grid resilience spiked following a series of dramatic storms over the past decade and ongoing worry about cybersecurity. The attention of the Department of Energy (DOE) and the Federal Energy Regulatory Commission (FERC or the Commission) has been recently focused on generation fuel security by those arguing this matter is of paramount concern. Yet, electric grid resilience is not a term found in federal legislation governing the authority of the FERC or the North American Electric Reliability Corporation (NERC). As the FERC proposes to define it (Docket No. AD18-7), resilience is a concept that cuts across state and federal jurisdictional lines, and has different jurisdictional implications depending on the nature of the wholesale marketplace in various regions of the county. State Commissions, local authorities, the FERC, the NERC and the DOE have important statutorily prescribed roles to play, but none have full responsibility in this area. As state and federal regulatory authorities seek to advance emerging recommendations in support of grid resilience, it is important for them and the electric industry generally to have a clear sense of the scope of, and limitations upon, their statutory authority.

This article describes the various activities taking place at the state and federal levels as the nation grapples with the challenge of grid resilience. Specifically with respect to the FERC and the NERC, the article addresses these organizations' assigned responsibilities under the Federal Power Act (FPA) section 215. FPA section 215 provides for the oversight of grid reliability, a term that has been construed to encompass much but not all of what is discussed in connection with grid resilience. The article also explores the scope of the FERC's ratemaking authority under FPA sections 205 and 206, and the extent to which that authority permits (or requires) the FERC to consider grid resilience in determining whether jurisdictional rates are just and reasonable.

Finally, the article addresses the scope of authority extended to the DOE under FPA section 202(c) and the Defense Production Act of 1950, both of which have been invoked by parties seeking support for proposals to buttress specific electric generating facilities that are said to be essential to grid resilience.

The article concludes that the FERC and the NERC have a vital role to play in advancing grid resilience, as do state and local authorities. Intervention by the DOE at this time runs the risk of substantially disrupting the regulatory framework assigned by Congress to the FERC and the NERC, and would substitute unilateral

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executive action for the balance of stakeholder interests and due process managed by these organizations.

I. INTRODUCTION

A. The Legacy of Hurricanes Katrina, Sandy, Harvey and Maria

With the landfall of Hurricane Katrina on August 23, 2005 and the extended aftermath of the storm, the wholesale destruction of a major American city, once the exclusive province of disaster films, became a reality. In the wake of that disaster, with each ensuing super storm, and with growing unease over the potential for widespread and disruptive cyber-attacks on the electric grid, the debate over resilience of the electrical grid has quickened.

The scope of damage caused by Hurricane Katrina was previously unimaginable to most. Eighty percent of New Orleans' land mass was flooded in the wake of the storm, and seventy percent of the city's occupied housing was damaged, while 100,000 people sought refuge in the city's Superdome.[1] New Orleans was not alone; extensive damage was sustained throughout the Gulf region, where more than one million people were displaced.[2] At the time, the Federal Emergency Management Agency (FEMA) estimated the storm to be the costliest on record, with total damage estimated at $108 billion.[3] Approximately 2.6 million electricity customers lost power in the Gulf region, Florida and Georgia, and it took Entergy 42 days to restore power to most customers who could accept it.[4] Within one year of Katrina, the population of New Orleans had decreased by over one half.[5]

The destruction associated with Katrina was not an isolated event. Just over seven years later, Hurricane Sandy wrought similar havoc on the Northeastern United States, causing approximately 7.9 million customers in 15 states and the District of Columbia to lose power.[6] Nearly 600,000 of those customers remained without power for over a week after the storm abated.[7] The financial damage caused by Sandy is estimated to be between $50-70 billion.[8]

In 2017, the United States endured two Category 4 hurricanes (Harvey and Irma), marking the first time on record that the nation has been impacted by two Category 4 or stronger hurricanes in the same year.[9] Hurricane Harvey caused

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1. *Hurricane Katrina Statistics Fast Facts*, CNN (Aug. 30, 2018, 4:21 PM), https://www.cnn.com/2013/08/23/us/hurricane-katrina-statistics-fast-facts/index.html [hereinafter *Katrina Fast Facts*].

2. *Id*.

3. *Id*.

4. Kacee Kirschvink, *Preparedness, Response and Reliability – Entergy Recounts Damage and Restoration from Katrina/Rita*, ENTERGY (Aug. 20, 2015), http://www.entergynewsroom.com/blog/preparedness-response-reliability-entergy-recounts-damage-restoration-from-katrina-rita; DOE: OFFICE OF ELECTRICITY DELIVERY AND ENERGY RELIABILITY, HURRICANE KATRINA SITUATION REPORT #11 (Aug. 30, 2005).

5. Katrina Fast Facts, *supra* note 1.

6. *Hurricane Sandy Fast Facts*, CNN (Oct. 19, 2017, 8:24 AM), https://www.cnn.com/2013/07/13/world/americas/hurricane-sandy-fast-facts/index.html [hereinafter *Sandy Fast Facts*].

7. *Id.*

8. *Id.*

9. *Irma's path of destruction,* CNN, https://www.cnn.com/specials/hurricane-irma (last visited Oct. 5, 2018); *Hurricane Harvey: Texas power outages affect more than quarter-million*, CBS (Aug. 26, 2017, 3:41

dramatic flooding to much of Houston, leaving approximately 336,000 customers without power.[10] Two weeks passed before power was restored to significant sections of the city.[11] Harvey is estimated to have caused at least 88 deaths[12] and damage reaching $125 billion.[13] Hurricane Irma made landfall in southwestern Florida on September 10, 2017, causing an estimated 7.5 million customers to lose power, 134 deaths (in the U.S.), and an estimated $50 billion in financial damage.[14]

An accounting of these events would be incomplete without mention of Hurricane Maria, which devastated Puerto Rico on September 20, 2017, and from which that island has yet to fully recover.[15] Maria decimated the island's electric grid nearly completely, and ten months thereafter, power had yet to be restored to thousands of residences.[16] Total economic losses from Maria are estimated at upwards of $100 billion, and the death toll may be higher than 4,480.[17]

At the opening of "*Lights Out*," author and former newsman Ted Koppel paints a fictional account of the mayhem that an extended blackout over a period of several weeks in a major metropolitan area such as New York City would wreak.[18] The focus of Koppel's book is cybersecurity, but the point he makes with respect to the consequences of long-term grid outages is broader and this, to a meaningful extent, animates today's resilience debate. It is against this backdrop that the regulatory and legal debate over grid resilience is taking place.

B. The Regulatory World Awakens

In the immediate aftermath of Hurricane Katrina and the ensuing storms, much of the discussion in electric reliability circles focused on local distribution

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PM), https://www.cbsnews.com/news/hurricane-harvey-texas-power-outages-affect-more-than-255000 (last visited Oct. 5, 2017) [hereinafter *Hurricane Harvey*].

10. *Hurricane Harvey*, *supra* note 9.

11. Edward Klump, *Restoring power meant battling wind, water, mosquitoes*, E&E NEWS (Sep. 12, 2017), https://www.eenews.net/stories/1060060359.

12. Giulia Afiune, *State says Harvey's death toll has reached 88*, TEXAS TRIBUNE (Oct. 13, 2017), https://www.texastribune.org/2017/10/13/harveys-death-toll-reaches-93-people.

13. Chris Mooney, *Hurricane Harvey was year's costliest U.S. disaster at $125 billion damages*, TEXAS TRIBUNE (Jan. 8, 2018), https://www.texastribune.org/2018/01/08/hurricane-harvey-was-years-costliest-us-disaster-125-billion-damages.

14. Kimberly Amadeo, *Hurricane Irma Facts, Damage, and Costs*, THE BALANCE (July 25, 2018), https://www.thebalance.com/hurricane-irma-facts-timeline-damage-costs-4150395; Office For Coastal Mgmt., *Fast Facts Hurricane Costs,* https://coast.noaa.gov/states/fast-facts/hurricane-costs.html (last visited Oct. 9, 2018).

15. Umair Irfan, *Puerto Rico's deadly record blackout is almost over*, VOX (Jul. 3, 2018), https://www.vox.com/2018/7/3/17530814/puerto-rico-power-blackout-over-hurricane-maria.

16. *Id*.; Nicole Goodkind, *Puerto Rico's Hurricane Maria Power Outage is now the worlds second largest blackout,* NEWSWEEK (May 12, 2018), https://www.newsweek.com/puerto-rico-power-hurricane-maria-blackout-882549.

17. *Mortality in Puerto Rico after Hurricane Maria,* THE NEW ENG. J. OF MED. (Jul. 12, 2018), https://www.nejm.org/doi/full/10.1056/NEJMsa1803972; Danica Coto, *'The job is not done': Puerto Rico's needs go unment 6 months after Maria,* CHICAGO TRIBUNE (Mar. 20, 2018), http://www.chicagotribune.com/sns-bc-cb--puerto-rico-six-months-after-maria-20180316-story.html.

18. TED KOPPEL, LIGHTS OUT: A CYBERATTACK, A NATION UNPREPARED, SURVIVING THE AFTERMATH (2016).

operations and strategies for hardening distribution assets and assuring speedier recovery from outages. These matters are largely within state and local control and generally the province of state public utility commissions, which have been quite active in overseeing proceedings leading to specific measures designed to reinforce local distribution systems. These issues have not gone away, and work at the local distribution level continues to be highly relevant.

Shifting focus over the past year, a substantial amount of attention has been directed to the federal level, where analyses and remedial measures are said to be needed to enhance elements of the grid that are subject to federal control, in the face of violent weather and the threat of physical and cyber-attacks. The issue burst on the federal regulatory scene with the Notice of Proposed Rulemaking (NOPR) filed by the DOE in FERC Docket No. RM18-1 on September 29, 2017.[19] There, the DOE asserted that the impact of past and impending retirements of large, centrally located generating stations threatened grid resilience, and called for the FERC to implement a rule directing certain Independent System Operators (ISOs) and Regional Transmission Organizations (RTOs) to provide out-of-market cost-based compensation for generators located within ISOs/RTOs that have 90-days on-site fuel supply available to them.[20] As a practical matter, the generators eligible for this treatment are coal and nuclear facilities.[21]

Comments opposing the DOE NOPR were broadly based and ranged substantially beyond the opposition one might have expected from the environmental community expressing concern over the promotion on non-renewable resources. The torrent of comments included those from traditional utilities, the natural gas and hydroelectric industries, and a variety of state regulators, substantially in agreement that DOE's singular focus on "fuel security" said to be associated with coal and nuclear facilities breezed past fundamental questions regarding the definition of resilience and its relationship to grid reliability, the varied nature of challenges to grid resilience across the nation, and the need to focus on generation reliability attributes before embarking on a program to provide support for generation employing specific fuel resources.

The FERC rejected the DOE proposal on January 8, 2018, and instead initiated a new proceeding in Docket No. AD18-7, discussed further below, in which ISOs/RTOs were directed to provide their evaluation of the resilience risks they face and the measures they are taking in response. [22] Responsive comments were invited.

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19. *Grid Resiliency Pricing Rule*, 82 Fed. Reg. 46,940 (2017) [hereinafter DOE NOPR].

20. *Id*.

21. DOE had previously been at work from some years studying grid resilience, resulting in its 2017 Staff Report. And while the Staff report expressed the need for further work on the nation's changing generation resource mix, it sounded no immediate alarm, and emphasized technology neutral solutions. DOE, *Staff Report to the Secretary on Electricity Markets and Reliability*, 124 (Aug. 2017), https://www.energy.gov/downloads/download-staff-report-secretary-electricity-markets-and-reliability [hereinafter *Staff Report to the Secretary*].

22. *Grid Reliability & Resilience Pricing Grid Resilience in Regional Transmission Organizations & Independent. System Operators*, 162 F.E.R.C. ¶ 61,012 at P 25 (2018) [hereinafter FERC Grid Resilience Order].

As also discussed further below, in Docket No. AD18-7, FirstEnergy Solutions Corporation (FirstEnergy) more recently asked the FERC to renew its consideration of the DOE's out-of-market compensation mechanism, claiming that the pending retirement of the identified generating facilities constituted an emergency.[23] As well, FirstEnergy filed with the DOE on March 29, 2018 a request for emergency action under FPA section 202(c), reiterating its position that the loss of these facilities poses a national emergency.[24] News that this request was being considered by the National Security Council, along with a proposal for the DOE to take action under the Defense Production Act of 1950, was leaked to the press in the spring of 2018 along with a draft legal memorandum justifying those actions.[25] Drama over these events was punctuated by a hearing held by the Senate Energy and Natural Resources Committee on June 12, 2018, in which the FERC Commissioners were reluctant to agree that a pending emergency justified the proposed the DOE action.[26]

C. What's Next?

As of the date of this article, the FERC has yet to address the issues raised by Docket No. AD18-7, nor has the DOE acted on the pending request for emergency action. The legal questions raised in these dockets and others include: (1) How resilience is defined, and what relationship the term has to "reliability" as that term is understood under FPA section 215[27] and subject to oversight by the FERC and NERC; (2) What authority and responsibility the FERC has for grid resilience under FPA sections 205 and 206[28] (rates); and (3) What authority DOE has under FPA section 202(c)[29] (emergencies) and the Defense Production Act of 1950.[30]

The factual and policy matters presented in these cases include the threshold factual question whether the case has been made that an emergency exists that threatens grid resilience as a result of past and planned generating station retirements in all or even some parts of the nation. Closely related is the question whether fuel security warrants a separate discussion, or should instead be considered as one among many attributes of a reliable electric grid. Also, there is the good question how efforts at the federal level relate to those at the state and local levels, where consideration of resilience first began.

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23. FirstEnergy Solutions Corp., Renewed Request for Emergency Action, *Grid Resilience in Regional Transmission Organizations and Independent System Operators*, FERC Docket No. AD18-7-000, at 11 (filed June 15, 2018) [hereinafter known as FirstEnergy Emergency Request].

24. FirstEnergy Solutions Corp., Letter to Sec. Perry Requesting Emergency Order Pursuant to FPA Section 202(c) (Mar. 29, 2018), https://statepowerproject.files.wordpress.com/2018/03/fes-202c-application.pdf [hereinafter known as FirstEnergy Letter].

25. *See generally* Draft DOE Memorandum, https://www.documentcloud.org/documents/4491203-Grid-Memo.html [hereinafter Draft DOE Memorandum]

26. Jeff St. John, *FERC Commissioners Agree: No Grid Emergency Exists to Justify Coal, Nuclear Bailout*, GREENTECH MEDIA (Jun. 12, 2018), https://www.greentechmedia.com/articles/read/ferc-commissioners-agree-no-grid-emergency-exists#gs.dfmrIXQ; *Congressional Testimony-Congressional Session 115th*, https://www.ferc.gov/media/cong-affairs/115.asp (last visited Oct. 9, 2018).

27. 16 U.S.C. § 824o.

28. *Id.* §§ 824d, 824e.

29. *Id.* § 824a(c).

30. 50 U.S.C. § 4501, *et seq.*

It is to these matters that this article now turns. The article concludes: (1) that resilience is a substantial element of the reliability regime subject to the NERC's authority and the FERC oversight; (2) that state and local authorities have substantial responsibilities in this area that they are indeed exercising; (3) that intervention by the DOE at this time runs the risk of substantially disrupting the regulatory framework assigned by Congress to the FERC and the NERC; and (4) that the DOE may play a productive role in organizing the disparate agencies with authority in this area to address resilience on a holistic and cost-effective basis.

II. THE MEANING OF "RESILIENCE"

A. Definition

FERC's consideration of resilience comes midway through an ongoing discussion of the topic in other quarters, but it is a useful place to begin because the agency has distilled a good deal of the conversation regarding definition of the term. Responding to the DOE NOPR (discussed in more detail, *infra*), and drawing substantially on work done by the National Infrastructure Advisory Council ("NIAC"),[31] the National Academy of Sciences ("NAS")[32] and Argonne National Laboratory ("Argonne Lab"),[33] FERC said it understands resilience to mean:

> The ability to withstand and reduce the magnitude and/or duration of disruptive events, which includes the capability to anticipate, absorb, adapt to, and/or rapidly recover from such an event.[34]

This definition is simply stated and grounded in common-sense.[35] But it is deceptive insofar as it speaks to a multi-faceted topic on which much has already been done and is being done. Further, discussion around resilience involves a broad range of assets and activities, some within and some beyond the FERC's authority. This includes local distribution, generation, transmission, operations, and planning – matters diversely regulated at the state, local and federal levels.

Resilience is not a term found in the federal statutory framework governing public utility regulation. The closest term found in federal energy law is "reliability." That term is the focus of FPA section 215, pursuant to which the FERC oversees the work of NERC, the FERC-certified Electric Reliability Organization

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31. *See* National Infrastructure Advisory Council, *A Framework for Establishing Critical Infrastructure Resilience Goals: Final Report and Recommendations by the Council* (Oct. 2010), https://www.dhs.gov/sites/default/files/publications/niac-framework-establishing-resilience-goals-final-report-10-19-10-508.pdf ("NIAC 2010 Report").

32. *See* National Academy of Sciences, *Enhancing the Resilience of the Nation's Electricity System*, WASHINGTON, DC: NATIONAL ACADEMIES PRESS (Sept. 2017), https://download.nap.edu/cart/download.cgi?record_id=24836 ("NAS 2017 Resilience Report").

33. *See* Department of Energy, Argonne National Laboratory, *Front-Line Resilience Perspectives: The Electric Grid* (Nov. 2016), https://energy.gov/sites/prod/files/2017/01/f34/Front-Line%20Resilience%20Perspectives%20The%20Electric%20Grid.pdf ("Argonne 2016 Report").

34. FERC Grid Resilience Order, *supra* note 22, at P 13. FERC does seek comment on the definition.

35. The NIAC, NAS, and Argonne work is discussed in further detail below.

(ERO).[36] As discussed further below, there is a significant degree of overlap between the subject matter governed by NERC's reliability standards and what is in play in the discussion of grid resilience.[37] But, having said that, from a statutory and regulatory standpoint, resilience is something of a proverbial square peg in a round hole, in the sense that the topic does not fit into a particular regulatory cubby or jurisdiction. As the NAS 2017 Resilience Report emphasizes, "[n]o single entity is responsible for, or has the authority to implement, a comprehensive approach to assure the resilience of the nation's electricity system."[38]

It is worth saying, though not so much as a matter of definition of the term resilience as a matter of emphasis, that much of the resilience discussion focuses on large scale, long-term outages and the events that might trigger them. As the NAS puts it, its focus is on "identifying, developing, and implementing strategies to increase the power system's *resilience* in the face of events that can cause large-area, long-duration outage; blackouts that extend over multiple service areas or states and last several days or longer."[39]

Put another way, it is the magnitude of the challenge that focuses our attention. Related discussions generally turn to catastrophic, high-impact, low probability events, including those associated with severe weather, cyber or physical attacks, earthquakes and geomagnetic disturbances.[40]

B. Resilience vs. Reliability – A False Dichotomy

1. Reach of the NERC and the FERC Authority Under FPA Section 215

It has been said with some vigor that resilience and reliability (as the latter term is understood in the context of FPA section 215) are not the same.[41] That statement is less than illuminating. Instead, it seems more helpful and precise to observe that the FERC has the statutory authority, by virtue of its oversight of the ERO, to oversee the development and enforcement of reliability standards applicable to the Bulk Power System[42] that promote the resilience of the grid, as the

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36. FERC certified NERC as the ERO in 2006. *Order Certifying N. Am. Elec. Reliability Corp. As The Electric Reliability Org. and Ordering Compliance Filing*, 116 F.E.R.C. ¶ 61,062 (2006) [hereinafter Certification Order].

37. *See infra* Part V.

38. *See generally* NATIONAL ACAD. OF SCI., ENG'G, MED., *Enhancing the Resilience of the Nation's Electricity System* (2017) [hereinafter *Enhancing Resilience*].

39. *Id*. at 7.

40. DHS, THE 2014 QUADRENNIAL HOMELAND SECURITY REVIEW (2014) (detailing a range of catastrophic man-made and natural hazards).

41. *See, e.g.*, FirstEnergy Solutions Corp., Renewed Request for Emergency Action, *Grid Resilience in Regional Transmission Organizations and Independent System Operators*, FERC Docket No. AD18-7-000, at 11 (filed June 15, 2018) [hereinafter known as FirstEnergy Emergency Request].

42. Revisions to Electric Reliability Organization Definition of Bulk Electric System and Rules of Procedure, Order No. 773, 141 FERC ¶ 61,236 (2012); order on reh'g, Order No. 773-A, 143 FERC ¶ 61,053 (2013), order on reh'g and clarification, 144 FERC ¶ 61,174 (2013), aff'd sub nom. People of the State of New York and the Pub. Serv. Comm'n of New York v. FERC, 783 F.3d 946 (2d. Cir. 2015).

term is understood above.[43] That authority is subject to specific jurisdictional and remedial limitations, and there are, accordingly, measures that may be taken to advance grid resilience that are beyond the FERC's and the NERC's reach, as discussed below. At the same time, the FERC and the NERC's responsibility under FPA section 215 to promote reliable service involves practices beyond the realm of grid resilience.

Under FPA section 215(c), the FERC is authorized to certify an ERO that "has the ability to develop and enforce . . . reliability standards that provide for an *adequate level of reliability*."[44] FPA sections 215(a)(3) and (a)(4) specify that reliability standards are to provide for the "reliable operation" of the Bulk Power System, while reliable operation is defined to mean "operating the elements of the bulk-power system . . . so that instability, uncontrolled separation, or cascading failures of such system will not occur as a result of a sudden disturbance, including a cybersecurity incident, or unanticipated failure of system elements."[45] Section 215(a)(3) further states that the term "reliability standard" encompasses the *operation* of existing bulk-power system facilities . . . and the *design* of planned additions or modifications to [Bulk Power System] facilities to the extent necessary to provide for reliable operation of the bulk-power system . . . ."[46] As discussed further below, the NERC standards aimed at the operation of the grid in the face of specifically defined disturbances and emergencies, and those addressed to design of the system in order to accommodate the loss of the largest facilities, are certainly crafted to enhance grid resilience as the FERC has defined it.

Also relevant, responding in 2013 to a directive dating back to the FERC's order certifying the ERO, the NERC filed with the FERC a definition of an "adequate level of reliability" (ALR) for which standards must provide that corresponds to the FERC's adopted definition of resilience, and the framework advanced by the NIAC.[47] The definition of ALR calls for reliability standards that are designed to meet five "Performance Objectives" over four time periods. Generally speaking, the performance objectives are designed to ensure that the Bulk Electric System (BES)[48] is operated and designed to avoid "uncontrolled separation, cascading outages or voltage collapse in normal circumstances and in re-

43. FPA section 215(b) specifies that the "Commission shall have jurisdiction. . . over the ERO . . . for purposes of approving reliability standards established under this section and enforcing compliance with this section." FPA section 215(c) provides that FERC may certify the ERO if it has "the ability to develop and enforce. . . reliability standards that provide for an adequate level of reliability of the bulk-power system . . . ."

44. 16 U.S.C. § 824o(c)(1) (emphasis added).

45. *Id.* § 824o(a)(3), (4). Under the NERC Glossary (part of the standards), "Disturbance" defined to include abnormal system conditions, or change in ACE caused by sudden failure of generation or interruption of load.

46. *Id.* § 824o(a)(3) (emphasis added).

47. *Informational Filing on the Definition of "Adequate Level of Reliability,"* NERC (May 10, 2013), https://www.nerc.com/pa/Stand/Resources/Documents/Adequate_Level_of_Reliability_Definition (Informational_Filing).pdf [hereinafter NERC Informational Filing].

48. Though FPA section 215 calls for oversight of the "Bulk Power System," NERC has historically addressed standards to the BES, as permitted by FERC.

sponse to predefined "disturbances," including multiple contingencies and equipment outages.[49] The time periods over which the performance objectives are to be met are these: (1) steady state (the period before a disturbance and after restoration has achieved normal operating conditions); (2) transient (the transitional period after a disturbance and during high-speed automatic actions in response); (3) operations response (the period after the disturbance where some automatic actions occur and operators act to respond); and (4) recovery and system restoration (the time period after a widespread outage through initial restoration to a sustainable operating state and recovery to a new steady state).[50]

The NERC, in its May 9, 2018 filing in FERC's *Grid Resilience in Regional Transmission Organizations and Independent System Operators* proceeding (Docket No. AD18-7), argues persuasively that in prescribing standards that anticipate disturbances and call for system restoration, the NERC's mission is aligned with the FERC's and the NIAC's definition of resilience.[51] The NERC states:

> The ALR, NIAC framework, and Commission [FERC] proposed definition of resilience demonstrate the manner in which resilience is an element of Reliable Operation over time in anticipation of and in response to an event . . . .NERC interprets the Commission's [FERC] proposed definition of resilience as intended to include both shorter-term elements of resilience and longer-term adaptability, consistent with the NIAC framework and NERC-filed ALR. Hence, resilience pertains to reliability before, during, immediately after, and in the longer-term after an event.[52]

The NERC goes on to list several reliability standards addressed to grid resilience, the most obvious of which include system design protocols (planning for loss of facilities) and emergency restoration.[53] The NERC's list is as follows:

- Reliability Standard TPL-001-4 (Transmission System Planning Performance Requirements): providing planning performance requirements in anticipation of potential events;[54]

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49. The ALR Performance Objectives are as follows: (1) "The BES does not experience instability, uncontrolled separation, [c]ascading [outages], or voltage collapse under normal operating conditions and when subject to predefined Disturbances"; (2) BES frequency is maintained within defined parameters "under normal operating conditions and when subject to predefined Disturbances; (3) BES voltage is maintained within defined parameters under "normal operating conditions and when subject to predefined Disturbances"; (4) "Adverse Reliability Impacts on the BES following low probability Disturbances (e.g., multiple contingences, unplanned and uncontrolled equipment outages, cyber security events, and malicious acts) are managed"; (5) "Restoration of the BES after major system disturbances such as blackouts or widespread outages" of BES elements is performed in a coordinated and controlled manner. The ALR Assessment Objectives are as follows:

> (1) BES Transmission capability is assessed to determine availability to meet anticipated BES demands during normal operating conditions and when subject to predefined Disturbances; (2) Resource capability is assessed to determine availability to the BES to meet anticipated BES demands during normal operating conditions and when subject to predefined Disturbances.

50. NERC Informational Filing, *supra* note 47.

51. Comments of the NERC, *Grid Resilience in Regional Transmission Organizations and Independent System Operators*, FERC Docket No. AD18-7-000 at P 8 (May 9, 2018) [hereinafter NERC Comments].

52. *Id*. at 6.

53. *Id*. at 8.

54. The standard establishes transmission planning performance requirements to ensure the grid will operate reliably over a broad spectrum of system conditions and following a wide range of probably contingencies.

- Reliability Standard EOP-004-3 (Event Reporting): requiring that entities report disturbances and events threatening reliability;
- Reliability Standard EOP-005-2 (System Restoration from Blackstart Resources): including requirements pertaining to preparation for system restoration from Blackstart resources after an event;
- Reliability Standard EOP-006-2 (System Restoration Coordination): requiring that plans and personnel be prepared to support system restoration after an event;
- Reliability Standard EOP-011-1(Emergency Operations): requiring operating plans to mitigate emergencies;
- Reliability Standard CIP-008-5 (Cyber Security - Incident Reporting and Response Planning): requiring plans to address reportable cyber security incidents;
- Reliability Standard CIP-014-2 (*Physical Security*): including physical security requirements; and
- Reliability Standard TPL-007-1 (*Transmission System Planned Performance for Geomagnetic Disturbance Events*): providing requirements related to geomagnetic disturbances.[55]

With this, it is clear that the NERC has taken steps to carry out its responsibility to promulgate and enforce standards that support the operation and design of a resilient grid. This is consistent with the FERC Commissioner LaFleur's concurring statement accompanying the FERC's decision terminating the DOE NOPR and initiating Docket No. AD18-7.[56]

It is open to argument whether the NERC has been sufficiently aggressive in promulgating standards addressing low-probability, high-impact events, that are often the focus of the resilience discussion. The NERC's TPL-001 planning standard addresses what are referred to as "credible contingencies," analyzed through an "N-1" engineering model.[57] The FERC took issue with what it perceived to be NERC's too-confined approach in issuing its directive compelling NERC to develop a standard addressing geomagnetic disturbances (GMD).[58] Other low-probability, high-impact events—including catastrophic storms or simultaneous cyber or physical attacks at multiple points of vulnerability—may also be the subject of further the NERC study and standard development. Whether the NERC moves in this direction on its own steam or in compliance with the

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See also NERC, Transmission System Planning Performance Requirements TPL-001-4, https://www.nerc.com/_layouts/15/PrintStandard.aspx?standardnumber=TPL-001-4&title=Transmission%20System%20Planning%20Performance%20Requirements&jurisdiction=United%20States.

55. NERC Comments, *supra* note 51, at PP 8-9.

56. FERC Grid Resilience Order, *supra* note 22 (Commissioner LaFleur, concurring) ("In my view, resilience – the ability to with stand or recovery from disruptive events and keep service customers – is unquestionably an element of reliability.").

57. *Reliability Concepts*, NERC 18, https://www.nerc.com/files/concepts_v1.0.2.pdf (last visited Oct. 15, 2018).

58. *See generally* Order No. 830, *Reliability Standard for Transmission System Planned Performance for Geomagnetic Disturbance Events*, 156 F.E.R.C. ¶ 61,215 (2016), *reh'g denied*, 158 F.E.R.C. ¶ 61,041 (2017) [hereinafter Order No. 830].

FERC directives, it will do so with the aid of its ANSI-approved stakeholder standards development process, and guided by the statutory requirement mandate that standards aim to achieve an "adequate level of reliability." That requirement implicitly calls for the NERC to make judgments regarding the reasonableness—and inevitably, the cost—of the proposed requirements. In any event, the extent to which the NERC addresses the more dramatic scenarios contemplated by those concerned with grid resilience will be a matter of matter of judgment, not statutory authority, which has clearly been provided.

2. Limitations of Authority under FPA Section 215

The reach of the NERC's and the FERC's authority under FPA section 215 is substantively limited in two important respects, discussed below. First, while FPA authorizes reliability standards that govern system operations and design, it does not permit the NERC (or the FERC) to compel investment in the grid. Second, neither the NERC nor the FERC have authority over local distribution.

As to the first of these limitations (investment in the grid), FPA section 215(a)(3) specifies that " . . . *the term ("reliable operation") does not include any requirement to enlarge such facilities or to construct new transmission capacity or generation capacity*."[59] Even more pointedly, FPA section 215(i)(2) specifies that Section 215 "does not authorize the ERO or the Commission [FERC] to order the construction of additional generation or transmission capacity or to set or enforce compliance with standards for adequacy or safety of electric facilities or services."[60] FERC, of course, has additional authority, discussed below, in its oversight of transmission and wholesale power rates, which enables it to provide compensation and associated incentives to elicit investment designed to assure grid resilience.[61]

As to facilities related to the distribution of power, in a further limitation under FPA section 215(a)(1), the term "bulk-power system" (describing the facilities and systems to which reliability standards may be addressed) expressly "does not include facilities used in the local distribution of electric energy."[62] With respect to the discussion of resilience, that limitation is substantial, since distribution facilities are on the front line with respect to disturbances associated with hurricanes and other naturally occurring events.[63]

Finally, as noted, it is worth observing that the reliability standards cover a range of practices designed to advance grid reliability in ways not directly relevant to resilience, as the FERC has defined it.[64] The NERC's full complement of standards includes those addressed to resource/load balancing, secure communications,

59. 16 U.S.C. § 824o(a)(3) (emphasis added).

60. *Id.* § 824o(i)(2).

61. This is discussed further below in connection with authority exercised under FPA sections 205 and 206. *See infra* Part V.B.

62. 16 U.S.C. § 824o(a)(1)(B).

63. *See infra* Part III.

64. *See generally All Reliability Standards*, NERC, https://www.nerc.com/pa/Stand/Pages/AllReliabilityStandards.aspx?jurisdiction=United%20States.

facility design and maintenance, personnel training and a long list of other matters not directly connected to the robustness of the grid and recovery from disruptions.[65] In this sense, reliability is a broader topic than resilience.

C. Relevant Studies

With increasingly commonplace extreme weather events and elevated concern over physical and cyber security, a growing body of work has been undertaken by organizations within and outside the government studying challenges to the grid and measures to improve its resilience. Some of the earliest of this work was commissioned by the NIAC, an advisory group created by Executive Order in 2001 to provide the President and executive agencies with high-level private sector input on security concerns related to critical infrastructure.[66] This and a group of ensuing studies by the NERC, Argonne Lab, the NAS and the DOE itself have served as the intellectual data base for a good deal of the discussion on the legal and policy choices facing the FERC and DOE in connection with grid resilience.[67]

Taken together, the studies detail the multiplicity of threats that face the electric grid, the varied nature of these challenges, and the wide variety of measures that are being implemented and under consideration at various regulatory levels, both state and federal. The studies also include discussion of fuel supply risk as one among the many challenges facing the industry.

1. NIAC's 2010 Resilience Report

The NIAC's 2010 Report describes resilience as part of a strategy to ensure continuity of service through efforts to minimize the impact of disruptions.[68] Drawing on its earlier work, the NIAC further defines resilience as "the ability to reduce the magnitude and/or duration of disruptive events" through four essential "abilities".[69] These abilities include: "(1) Robustness – the ability to absorb shocks and continue operating; (2) Resourcefulness – the ability to skillfully manage a crisis as it unfolds; (3) Rapid Recovery – the ability to get services back as quickly as possible; and (4) Adaptability – the ability to incorporate lessons learned from past events to improve resilience."[70]

The NIAC describes the U.S. electric sector as highly reliable and resilient, due principally to "rigorous planning, construction, and operating requirements," a highly-integrated and dynamically managed bulk power system, and "a strong culture of commitment to reliability and mutual assistance."[71] The NIAC further

65. *Id.*

66. *Exec. Order No. 13,231*, 66 Fed. Reg. 53,063, at 53,069 (Oct. 18, 2001).

67. Argonne 2016 Report, *supra* note 33; *see also Enhancing Resilience*, *supra* note 38.

68. *See generally* NIAC 2010 Report, *supra* note 31.

69. *Id*. at 8.

70. *Id.* (NIAC notes that this resilience construct was originally conceived by resilience expert Stephen Flynn).

71. *Id*.

observes that many of these practices "are so ingrained in the operations and culture of the utility industry that many within the industry do not label them as resilience."[72] The NIAC also found that current electric sector practices suggest that "several underlying resilience goals" have already been adopted, including the ability to: "(1) Withstand a shock from any hazard with no loss of critical functions; (2) Prevent a power disruption from cascading into interconnected systems; (3) Minimize the duration and magnitude of power outages through rapid recovery strategies; and (4) Mitigate future risks by incorporating lessons from past disruptions, exercises, and risk assessments."[73]

The NIAC does identify fuel supply and delivery as a "cross-sector risk" which is "beyond the purview of a single company or even the entire industry," and which may affect electric sector reliability and resilience.[74] The NIAC also highlights other challenges to electric sector resilience: (1) limited availability to utilities of extra-high-voltage transformers due to lengthy manufacturing lead-times and complicated transportation logistics; (2) market and regulatory constraints limiting utilities' ability to recover costs of reliability and resilience investments; (3) timely access by utilities to actionable threat information, which often is classified; and (4) utility restoration planning and black-start capabilities.[75]

Among the recommendations identified in the NIAC 2010 Report is the need for an industry-wide plan to address major national disasters, improved information sharing by federal agencies with the private sector, and adoption by all critical infrastructure sectors of self-governance models (such as those that have been developed by the North American Transmission Forum) that will allow private sector entities to collaborate on industry-wide resilience issues outside the formal regulatory framework.[76]

2. NERC's 2014 Polar Vortex Review

In September 2014, the NERC issued a report in which it reviewed events that occurred during the polar vortex – a severe cold wave that affected much of the Midwest, South Central and East Coast regions in early 2014.[77] The NERC explains that the polar vortex increased demand from natural gas, which resulted in a "significant amount of gas-fired generation being unavailable due to curtailments of gas," and forced one balancing authority to shed firm load.[78]

72. *Id*.

73. NIAC 2010 Report, *supra* note 31, at 6.

74. *Id*.

75. *Id*. at 7.

76. *Id*. at 8-9.

77. *Polar Vortex Review*, NERC iii (2014), https://www.nerc.com/pa/rrm/January%202014%20Polar%20Vortex%20Review/Polar_Vortex_Review_29_Sept_2014_Final.pdf [hereinafter NERC Polar Vortex Review].

78. *Id*.

Reflecting on this event, the NERC's Polar Vortex Review outlines a series of "observations and recommendations to improve performance ahead of and during cold weather events."[79] The NERC recommended that entities review gas supply and transportation issues, and work with gas suppliers, market operators, and regulators to develop actions that might be needed.[80] The NERC also suggested entities review and update weatherization programs for power plants and improve operational awareness of fuel status and pipeline conditions relevant to all generators. The NERC further recommended entities ensure that their on-site fuel supply is adequately protected from the effects of cold weather.[81]

3. Argonne Lab's 2016 Report

Argonne Lab's 2016 Report defines grid resilience generally as the ability of the grid to "minimize disruptions to energy service by anticipating, resisting, absorbing, responding to, adapting to, and recovering from a disturbance," adding that design of the grid "has the potential to make it quite resilient."[82] Argonne Lab's analysis is focused on how states and local utilities are "approaching all-hazards resilience in planning, construction, operations, and maintenance of the electric system, as well as challenges faced when addressing all-hazards resilience."[83]

The report defines threats and hazards as "anything that can disrupt or impact a system."[84] With respect to electric infrastructure, Argonne Labs says that threats may be universal (e.g., physical attacks) or vary by location and time of year (e.g., severe weather), or likelihood of occurrence (e.g., "highly likely" weather-related events versus a "less likely" electromagnetic pulse).[85] The Argonne Lab report identifies "increased extreme weather and climate change and the aging of the grid itself" as the most critical threats to the electric distribution system.[86] Other threats include physical and cyber-attacks, capacity constraints, and supply-chain dependencies and disruption.[87]

The Argonne Lab report further identifies options electric utilities are "actively pursuing with regard to increasing resilience."[88] These include: physical system hardening, security measures that detect and deter intrusions and attacks, system modernization including control enhancements and smart grid technology, decentralization of the grid, implementation of redundancy measures, inventory management, and risk modeling.[89]

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79. *Id*.
80. *Id*.
81. *Id*. at iii-iv.
82. Argonne 2016 Report, *supra* note 33, at xiii.
83. *Id*.
84. *Id*.
85. *Id*.
86. *Id*. at xiv.
87. Argonne 2016 Report, *supra* note 33, at xiv (Table E.1).
88. *Id*.
89. *Id*. at xv-xviii.

Argonne Lab states that utilities most frequently focus their resilience efforts on hardening components against natural hazards, enhancing vegetation management, protecting and replacing infrastructure, and technology and control enhancements.[90] It points to smart meter and grid technology as among the most effective means of advancing grid resilience.[91]

The Argonne Lab report further notes that while utilities often have backup inventory on hand to support restoration efforts for 2-3 days, longer restoration efforts could require restocking.[92] Utility arrangements for mutual assistance and equipment sharing also "facilitate aid and emergency assistance during or after a disaster."[93]

The barriers Argonne Lab identifies to improving resilience include: (1) cost; (2) ambiguities in state and local policies and regulations; (3) an incomplete understanding of dependencies and interdependencies among energy infrastructure and other critical infrastructure; and (4) continued uncertainty with respect to threats and hazards including "global climate change impacts" and "threats driven by human behavior."[94]

4. The NAS' 2017 Resilience Report

The NAS' 2017 Resilience Report focuses on "identifying, developing, and implementing strategies to increase the power system's *resilience* in the face of events that can cause large-area, long-duration outages: blackouts that extend over multiple service areas and last several days or longer."[95] NAS maintains that resilience is "broader than reliability," pertaining not only to "lessening the likelihood that . . . outages will occur" but extends to "limiting the scope and impact of outages when they do occur, restoring power rapidly afterwards, and learning from these experiences to better deal with events in the future."[96] Recognizing that the production and delivery of power differs meaningfully between regions with traditional vertically-integrated utilities and those that are more market-oriented, the NAS advises that efforts to improve resilience "must accommodate institutional and policy heterogeneity across the country," and accommodate "a diverse set of technical and institutional arrangements and a wide variety of hazards."[97]

The NAS report evaluates: (1) techniques that can be employed before an event occurs, to enhance system resilience; (2) efforts to better understand and mitigate the impacts of a disruption to the grid, particularly in the wake of large failures that might result in prolonged outages; and (3) preparatory measures that can be taken in advance to better ensure effective system restoration.[98] It notes

90. *Id*. at xiv.
91. *Id*.
92. Argonne 2016 Report, *supra* note 33, at xviii.
93. *Id*.
94. *Id*. at xix.
95. *Enhancing Resilience*, *supra* note 38, at 1.
96. *Id*.
97. *Id*. at 2.
98. *Id*. at 3.

that resilience strategies may differ based on type of event, and expressed concern that operational planning and prioritization within the industry seems overly focused on short-term issues to the detriment of consequences of "large-area, long-duration blackouts."[99]

The NAS recommends that electric industry stakeholders, in cooperation with the Electricity Subsector Coordinating Council, state agencies, the FERC and the NERC, conduct more regional preparedness exercises that simulate accidental failures, and physical and cyber-attacks.[100] It adds that steps should be taken within the industry to "more rapidly implement resilience-enhancing technical capabilities and operational strategies that are available today."[101] The NAS urges lawmakers and the DOE to expand grid modernization research and development to focus on improving grid resilience.[102] Additionally, the NAS suggests the DOE and the Department of Homeland Security ("DHS") establish a process to consider and assess "plausible large-area, long-duration grid disruptions that could have major economic, social, and other adverse consequences."[103] The FERC and the NERC, meanwhile, should establish "small system resilience groups" to "assess and, as needed, to mandate strategies designed to increase the resilience" of the grid.[104] And the NAS suggests that the National Association of Regulatory Utility Commissioners provide guidance and support to state regulators regarding how best to respond to "identified local and regional power system-related vulnerabilities."[105]

Finally, NAS recommends the following: (1) "DOE should improve understanding of customer and societal value associated with increased resilience and review and operationalize metrics for resilience;" (2) DHS and DOE should work closely with utilities and stakeholders to improve physical and cyber security and resilience; (3) electric infrastructure owners and operators should collaborate with DOE to review prior outages and to demonstrate technologies and exercises that increase grid resilience; (4) state regulators should work with local utilities to assess the preparedness of backup power systems; and (5) NERC should review and improve its internal incident investigation processes."[106]

5. The DOE's 2017 Staff Report

Responding in August 2017 to a directive of the Secretary of Energy, the DOE issued a Staff report addressed to the evolution of wholesale markets on grid

99. *Id*. at 2.
100. *Enhancing Resilience*, *supra* note 38, at 3.
101. *Id*. at S-6.
102. *Id*. at S-6 – S-8.
103. *Id*. at S-9.
104. *Id*.
105. *Enhancing Resilience*, *supra* note 38, at S-10.
106. *Id*. at S-11 – S-12.

reliability and resilience.[107] The DOE Staff reports that no immediate threat to reliability exists despite considerable generator capacity retirements over recent years, and changes in the generation resource mix.[108] The study notes that while wholesale power markets operated by Regional Transmission Organizations and Independent System Operators (RTOs/ISOs) have achieved reliable electricity delivery with economic efficiencies, "changing circumstances have challenged both centrally-organized and, to a lesser extent, vertically-integrated markets."[109] The study further finds that "evolving marketing conditions and the need to accommodate [variable energy resources] have led to the increased flexible operation of generation and other grid resources," and concludes that while markets recognize and compensate reliability, "more work is needed to address resilience."[110] Notably, the DOE staff recommended that "[r]esource portfolios could be complemented with wholesale market and product designs that recognize and complement resource diversity by compensating providers for the value of [essential reliability services] on a technology-neutral basis."[111]

The DOE Staff Report further states that "fuel assurance is a growing consideration for the electricity system," and it adds that while "maintaining onsite fuel resources is one way to improve fuel assurance," "most generation technologies have experienced fuel deliverability challenges in the past."[112] More specifically, the DOE staff notes that "[w]hile coal facilities typically store enough fuel onsite to last for 30 days or more, extreme cold can lead to frozen fuel stockpiles and disruption in train deliveries."[113]

6. The DOE 2017 Quadrennial Energy Review

The second installment of the DOE's Quadrennial Energy Review (QER) includes a focus on enhancing the resilience of the grid to minimize disruptions of service and return rapidly to normal operations following adverse events. [114] Among the key findings made by the DOE in its QER is that "[e]lectricity outages disproportionately stem from disruptions on the distribution system (over 90 percent of electric power interruptions), both in terms of the duration and frequency of outages."[115] The DOE added that "[d]amage to the transmission system, while infrequent, can result in more widespread major power outages that affect large

107. DOE, STAFF REPORT TO THE SECRETARY ON ELECTRICITY MARKETS AND RELIABILITY 1 (2017), https://www.energy.gov/downloads/download-staff-report-secretary-electricity-markets-and-reliability [hereinafter DOE STAFF REPORT].

108. *Id*. at 63, 100.

109. *Id*. at 10.

110. *Id*. at 10-11.

111. *Id*. at 100.

112. DOE STAFF REPORT, *supra* note 107, at 11.

113. *Id*. at 11-12.

114. DOE, QUADRENNIAL ENERGY REVIEW, SECOND INSTALLMENT, Chapter IV at 4-1 (Jan. 2017), https://www.energy.gov/sites/prod/files/2017/02/f34/Quadrennial%20Energy%20Review--Second%20Installment%20%28Full%20Report%29.pdf [hereinafter DOE QER].

115. *Id*. at 4-2.

numbers of customers with significant economic consequences."[116] By the DOE's estimate, then, the greatest threat to reliability stems directly from distribution and transmission-related outages.[117]

Other reliability and resilience-related findings made by the DOE in the QER are these:

- "The leading cause of power outages in the United States is extreme weather, including heat waves, blizzards, thunderstorms, and hurricanes. Events with severe consequences are becoming more frequent and intense due to climate change, and these events have been the principal contributors to an observed increase in the frequency and duration of power outages in the United States."[118]
- "Grid owners and operators are required to manage risks from a broad and growing range of threats. These threats can impact almost any part of the grid (e.g., physical attacks), but some vary by geographic location and time of year. Near-term and long-term risk management is increasingly critical to the ongoing reliability of the electricity system."[119]
- "Other risk factors stem from the increasing interdependency of electric and natural gas systems, as natural gas–fired generation provides an increasing share of electricity. However, coordinated long-term planning across natural gas and electricity can be challenging because the two industries are organized and regulated differently."[120]

7. NERC Reliability Assessments

Summarizing in a 2017 "Synopsis" the analyses undertaken in reliability assessments over the past several years, the NERC identifies the following most pressing reliability issues in connection with the nation's changing resource mix:[121]

- "As conventional resources prematurely retire, sufficient amounts of essential reliability services, such as frequency and voltage support, ramping capability, etc., must be replaced based on the configuration and needs of the system."[122]

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116. *Id*.

117. *Id*.

118. *Id*.

119. DOE QER, *supra* note 114, at 4-2.

120. *Id*.

121. NERC, *Comments of the North American Electric Reliability Corporation to the United States Department of Energy Concerning the "Staff Report to the Secretary on Electricity Markets and Reliability*" (May 9, 2017), https://www.nerc.com/news/Headlines%20DL/DOE%20Grid%20Study%20Comments%2012OCT17.pdf; *see, e.g.*, 16 U.S.C. § 824o(g).

122. NERC, Synopsis of NERC Reliability Assessments: The Changing Resource Mix and the Impacts of Conventional Generation Retirements at 3 (May 9, 2007) [hereinafter NERC 2017 Synopsis].

- "Resource flexibility is needed to supplement and offset the variable characteristics of solar and wind generation."[123]
- "Higher reliance on natural gas exposes generation to fuel supply and delivery vulnerabilities, particularly during extreme weather conditions. [F]uel diversity and security provides best assurance for resilience. Premature retirements of fuel secure baseload generating stations reduces resilience to fuel supply disruptions."[124]
- "Because the system was designed with large, central-station generation as the primary source of electricity, significant amounts of new transmission may be needed to support renewable resources located far from load centers."[125]

The NERC's recommendations include pitches for: (1) market operators and state regulators to consider grid reliability when considering resource adequacy; (2) pricing policies that would limit the retirement of existing base-load assets; and (3) regulatory consideration of the reliability impact of natural gas transportation policies.[126] Finally, the NERC recommends that it "conduct a comprehensive evaluation of its Reliability Standards to ensure they are compatible with large amounts of non-synchronous resources," and properly reflect "expectations related to essential reliability services, generator performance, and balancing."[127]

III. STATE-BASED PROCEEDINGS

The focus on resilience at the distribution level has been ongoing for quite some years, with needed efforts driven in large part by the increased frequency and intensity of extreme weather-related events over the past decade, such as Hurricanes Sandy (2012), Katrina (2005) and Harvey (2017), as well as numerous ice storms and wildfires, which resulted in widespread power outages and destruction. In the aftermath of such events, discussion has concentrated on the ability of utility electric distribution infrastructure to withstand such devastating storms, as state regulators and officials have pressed for close scrutiny of the matter, and post mortem investigations into utility preparedness and response have resulted in new legislation and regulations, and development of increasingly rigorous standards and practices with an eye towards preventing and mitigating storm-related damage and outages, and improving utility response times. Efforts to address and prevent distribution-level damage and outages have commonly assumed a two-pronged approach in the form of system hardening (*i.e.*, to prevent damage in the first instance) and recovery (*i.e.*, to facilitate ongoing utility operations when distribution

123. *Id*.

124. *Id*.

125. *Id.* at 3, 5-11 (The NERC Synopsis also summarizes and identifies key findings and recommendations from several Reliability Assessments and reports prepared by NERC over the years.).

126. *Id*. at 3.

127. NERC 2017 Synopsis, *supra* note 122, at 4.

assets are damaged, and to promote rapid restoration to normal operating conditions), an approach that is conceptually very much in line with the FERC's definition of resilience.[128]

What follows is a selective report on activities in New York, Florida, California, Maryland and New Jersey, certain of the states that have been most active in this area following the substantial challenges they have faced.

A. New York

New York has been among the more active states in this area, with activity that began soon after Hurricane Sandy. Following the issuance of a high-profile report and Governor's recommendation, the New York Public Service Commission (NY PSC) directed jurisdictional utilities in the state to implement a broad range of measures aimed at improving (1) the development and timely issuance of localized restoration times; (2) utility mutual assistance; and (3) improving procedures for responding to large-scale flooding events.[129]

In 2014 the NY PSC approved a multi-year rate plan for Consolidated Edison Company of New York, Inc. (ConEd), enabling the utility to invest significantly in storm hardening and resiliency, including the undergrounding of certain facilities in order to protect against coast storm surge.[130] The ConEd proposal was made in response to Hurricane Sandy, which caused significant damage to the ConEd utility system, resulting in service outages to over one million of the company's electric customers.[131] As required by the 2014 order, in November 2014 ConEd filed a report detailing its storm hardening and resiliency plan for 2014-15, which the NY PSC subsequently adopted.[132] In 2016, the NY PSC approved ConEd's

128. *See generally* EDISON ELECTRIC INSTITUTE, BEFORE AND AFTER THE STORM: A COMPILATION OF RECENT STUDIES, PROGRAMS, AND POLICIES RELATED TO STORM HARDENING AND RESILIENCY 1-18 (Mar. 2014), http://www.eei.org/issuesandpolicy/electricreliability/mutualassistance/Documents/BeforeandAfterStorm.pdf. (Hardening measures include undergrounding of distribution lines, vegetation management, adoption of more stringent design and construction standards, consideration of facility placement, and use of advanced technologies such as smart grid applications and self-healing grid components. Recovery measures, meanwhile, include enhanced and formalized mutual assistance among utilities, enhanced communication and coordination, as well as availability of response-related equipment, back-up restoration supplies, and spare grid components.

129. MORELAND COMMISSION ON UTILITY STORM PREPARATION AND RESPONSE, FINAL REPORT (June 22, 2013), http://www.governor.ny.gov/assets/documents/MACfinalreportjune22.pdf; State of New York, *Governor Cuomo Announces Strengthened Emergency and Storm Response Requirements for Utilities* (Aug. 15, 2013), https://www3.dps.ny.gov/pscweb/webfileroom.nsf/Web/834E373162E40F9D85257BC8006B86B2/$File/Gov%208-15-13.pdf?OpenElement.

130. New York P.S.C., Cases 13-E-0030, *et al.*, *Con Edison – Electric Rates, Order Approving Electric, Gas and Steam Rate Plans in Accord With Joint Proposal* (issued Feb. 21, 2014).

131. *Id*. at 1.

132. New York P.S.C., Cases 13-E-0030, *et al.*, *Order Adopting Storm Hardening and Resiliency Phase Two Report Subject to Modifications*, at 2 (issued Feb. 5, 2015).

$459 million storm-hardening and resiliency plan for 2016, to strengthen that utility's electric distribution system and other assets.[133] The plan details storm-hardening efforts that include improvements to its coastal network, strengthening overhead transmission and distribution lines, and fortifying generating stations.[134] Other measures include reinforcing perimeter walls, installing gates and floodwalls, and raising critical equipment.[135] Further, the NY PSC directed ConEd to have dual-fuel back-up generators at two generating stations and two transmission stations "whose loss would have the greatest impact to customers," and further required ConEd to "immediately incorporate in its emergency procedures a process for procuring and staging diesel fuel trucks for stations" and required that ConEd's "fuel facilities are fully refilled in advance of need."[136]

B. Florida

The Florida Public Service Commission has undertaken numerous proceedings on storm hardening and resiliency over the years. As early as 2006, following a series of destructive hurricanes, the Florida Commission initiated a multi-year investigation into hardening utility systems, leading to the adoption of a series of rules requiring electric utilities to take steps to ensure that their infrastructure is capable of withstanding severe storms.[137] The rules call for utilities to inspect wooden utility poles and to file storm hardening plans describing in detail construction standards and practices used to enhance reliability of electric facilities.[138] More recently, responding to the impact of Hurricanes Matthew, Hermine, Irma, Maria and Nate, the Florida Commission launched a wide-ranging inquiry into utility preparation, asset resilience and restoration, principally focused on distribution assets.[139] The inquiry covered several topics including: (1) staging for utility personnel and mutual aid; (2) damage assessment; (3) restoration workload; (4)

133. New York P.S.C., Case No. 13-E-0030, *et al.*, *Order Adopting Storm Hardening and Resiliency Phase Three Report Subject to Modifications*, at 15 (issued Jan. 25 2016), http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7B55EA4672-4CA7-409D-A281-0EFD055B083A%7D [hereinafter January 2016 Order].

134. Press Release, *PSC Approves $459M Con Edison Storm-Hardening Plan for 2016 — NYC Utility Storm-Hardening Efforts and Investments Hit All-Time Peak*, New York P.S.C. (Jan. 22, 2016), https://www3.dps.ny.gov/pscweb/webfileroom.nsf/Web/3017A6317FE9B3B485257F42006A26A1/$File/pr16005.pdf?OpenElement.

135. January 2016 Order, *supra* note 133, at 6.

136. *Id.* at 11.

137. *See generally* FL. PUB. SERV. COMM'N, *Report to the Legislature on Enhancing the Reliability of Florida's Distribution and Transmission Grids During Extreme Weather* (July 2007).

138. *See generally* FL. PUB. SERV. COMM'N, Docket Nos. 060078-EI (Feb. 27, 2006), 060198-EI (Apr. 4, 2006), 060172-EU (Jan. 17, 2007), 060173-EU (Jan. 17, 2007).

139. FL. PUB. SERV. COMM'N, Docket No. 20170215-EU, Review Of Electric Utility Hurricane Preparedness And Restoration Actions (Nov. 14, 2017).

needed staffing; (5) customer communications; (6) needed materials; and (7) restoration.[140]

C. California

In California, following a December 2011 windstorm causing widespread outages in Southern California, the state enacted new legislation that required the California Public Utilities Commission to establish (within an existing proceeding) standards for utility disaster and emergency preparedness plans, and further required electric utilities in the state to develop, adopt and update emergency and disaster preparedness plan every two years.[141] In addition, numerous California utilities, including the Sacramento Municipal Utility District and Los Angeles Department of Water & Power, have been closely involved in state-wide workshops and working groups aimed at developing best practices addressed to the identification and mitigation of distribution-level risks and vulnerabilities.[142]

D. Maryland

Less than one month following the "derecho" storm of June 29, 2012 which devastated utility infrastructure throughout the Midwest and Mid-Atlantic regions, the Governor of Maryland issued an Executive Order establishing a task force to gather recommendations on how to improve the resilience and reliability of Maryland's electric distribution network.[143] The task force ultimately developed a series of eleven recommendations to improve distribution grid resilience through use of technology and process improvements.[144]

E. New Jersey

Following Hurricane Irene in August 2011, the New Jersey Board of Public Utilities (BPU) convened six public hearings to solicit input regarding the state of preparedness and responsiveness of New Jersey's four Electric Distribution Companies (EDCs) prior to, during and after the hurricane.[145] Soon thereafter, in October 2011, a severe snowstorm caused widespread power outages in the state.[146] In the wake of these weather events the BPU issued a preliminary staff report in

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140. FL. PUB. SERV. COMM'N, Docket No. 20170215-EU, *Review of Electric Utility Hurricane Preparedness and Restoration Actions, Staff's First Data Request* (Nov. 14, 2017), http://www.floridapsc.com/library/filings/2017/09780-2017/09780-2017.pdf (Prior to this inquiry, the Florida PSC had required jurisdictional utilities to prepare and file plans for hardening their facilities in anticipation of destructive storms.).

141. A.B. 1650, Public Utilities: Emergency and Disaster Preparedness, ch. 472 (Cal. 2012).

142. *Joint Parties' Filing of Updated Draft Straw Proposal for Physical Security Regulations*, Cal. Pub. Utils. Comm'n Rulemaking No. 15-06-009 (filed Aug. 31, 2017), http://docs.cpuc.ca.gov/SearchRes.aspx?DocFormat=ALL&DocID=196148336.

143. Md. Exec. Order 01.01.2012.15, *Improving the Resiliency of Maryland's Executive Distribution System* (Jul. 25, 2012).

144. Grid Resiliency Task Force, *Weathering the Storm: Report of the Grid Resiliency Task Force* (Sept. 24, 2012).

145. NEW JERSEY BD. OF PUB. UTIL., HURRICANE IRENE ELECTRIC RESPONSE REPORT 4 (Dec. 14, 2011), https://nj.gov/bpu/pdf/announcements/2011/irene.pdf [hereinafter Staff Report].

146. *Id*. at i.

December 2011, examining storm planning and restoration activities undertaken by the EDCs.[147] The staff report outlined a number of recommendations and created an action plan for EDCs to implement "lessons learned" following Hurricane Irene.[148] With respect to storm hardening and resilience of electric distribution infrastructure in the state, the staff report highlighted a need for action to prevent damage to local distribution substations due to water intrusion, and to overhead distribution facilities as a result of vegetation in utility right-of-ways and easements.[149] Among the recommendations advanced by BPU staff was the need for distribution utilities to review and develop plans to mitigate potential flooding of substations constructed below flood plain levels by constructing flood walls, raising or relocating affected equipment.[150]

A subsequent August 2012 report prepared by Emergency Preparedness Partnerships (EPP) for the BPU examined closely the performance of New Jersey's EDCs following Hurricane Irene and the October snow storm, and provided a series of recommendations (both utility-specific recommendations as well as global recommendations applicable to all EDCs) to improve certain identified areas of weakness of the EDCs' existing storm preparedness and post-storm response policies and practices.[151] These findings and recommendations addressed among other things: improved vegetation management practices; use of distribution automation to protect the integrity of the distribution system and to improve reliability; the need for action to protect substations vulnerable to wind, rain or flooding; improved utility emergency response plans to manage restoration efforts; and improved external communications and outreach.[152] Following its release of the EPP report, the BPU opened a public comment period, and on January 23, 2013 issued an order containing a series of findings and directives related to preparedness efforts, communications, restoration and response, post event actions, and infrastructure issues.[153] Additional work is ongoing.[154]

IV. PROCEEDINGS AT DOE AND FERC

A. The DOE NOPR (RM18-1) and Ensuing FERC Docket No. AD18-7

1. The DOE NOPR

The DOE focused national attention on grid resilience with its release on September 29, 2017 of a NOPR proposing that the FERC issue a rule directing

147. *Id*.

148. *Id.* at 26.

149. *Id.* at 15-17.

150. Staff Report, *supra* note 145, at 27.

151. *Performance Review of EDCs In 2011 Major Storms*, EMERGENCY PREPAREDNESS PARTNERSHIPS (Aug. 9, 2012), https://www.nj.gov/bpu/pdf/announcements/2012/stormreport2011.pdf.

152. *Id*. at 8-36.

153. New Jersey B.P.U., *In the Matter of the Board's Review of the Utilities' Response to Hurricane Irene*, Order, Docket No. EO11090543 (Jan. 23, 2013), https://www.state.nj.us/bpu/pdf/boardorders/2013/20130123/1-23-13-6B.pdf.

154. *Id*.

RTOs/ISOs to implement pricing policies designed to "accurately price" generating resources so that "the reliability and resilience attributes of generation with on-site fuel supplies are fully valued."[155] Citing concern over the impact of past and impending retirements of large, centrally located generating stations, the DOE proposed that the FERC implement a rule directing certain Independent System Operators (ISOs) and Regional Transmission Organizations (RTOs) to provide out-of-market cost-based compensation for generators located within ISOs/RTOs that have 90-days on-site fuel supply available to them.[156] As a practical matter, the generators eligible for this treatment would be coal and nuclear facilities. According to DOE, these units "provide reliable capacity, resilient generation [and] frequency and voltage support."[157] The DOE directed the FERC to take quick action -- within 60 days of publication of the NOPR in the *Federal Register* -- a time frame said to be necessary to avert risk during the then-upcoming heating season.[158]

DOE issued the NOPR under section 403 of the DOE Organization Act, which authorizes "[t]he Secretary and the Commission [FERC] . . . to propose rules, regulations and statements of policy of general applicability with respect to any function within the jurisdiction of the Commission [FERC]."[159] Section 403(b) of the DOE Organization Act further authorizes the Secretary of Energy to establish "reasonable time limits" for completion of action by the FERC.[160] The Secretary of Energy's authority under this provision has rarely been acted on, though DOE cited a 1979 NOPR regarding transportation of natural gas, making reference without citation to other instances in which the DOE has taken action.[161] In support of the need for a rule, the DOE cited its own 2017 Grid Study and NERC reliability assessments for the view that early retirement of a substantial fleet of baseload generating resources threatens reliability.[162] DOE further cited the FERC's price formation dockets questioning whether capacity markets are achieving desired investment.[163] The DOE also cited the 2014 Polar Vortex and the NERC's ensuing report in support of the need for on-site fuel resources.[164] For good measure, Secretary of Energy Rick Perry's letter accompanying the NOPR, and the NOPR itself, makes reference to recent hurricanes.[165]

Reaction to the DOE NOPR was animated and extensive. As might have been expected, the NOPR was well-received by coal producers, and of course by the set of asset owners it was designed to benefit, including FirstEnergy most

155. DOE NOPR, *supra* note 19, at 46,945.
156. *Id*.
157. *Id*.
158. *Id*.
159. 42 U.S.C. § 7173 (1977).
160. *Id*.
161. DOE NOPR, *supra* note 19, at 46,941.
162. *Id.* at 46,942.
163. *Id*. at 46,945.
164. *Id*. at 46,942.
165. *See generally* DOE NOPR, *supra* note 19.

prominently.[166] On the flip side of the issue, environmental groups weighed in vocally in opposition to what they perceived as an effort designed to advance coal-fired generation at the expense of renewable supply.[167]

Joining the environmental groups were those representing electricity producers other than coal and nuclear power, including the natural gas and hydroelectric industries.[168] These parties, joined by the ISOs and RTO, argued that DOE's proposed intervention would disrupt RTO/ISO administered markets, with resulting inefficiencies and costs, and without advancing grid resilience.[169]

Others, while recognizing the importance of a national discussion over grid resilience, complained that the NOPR began with a specific set of favored generation solutions without defining resilience itself, detailing the range of assets that might be useful in reinforcing the grid or identifying the reliability characteristics or attributes most useful in order to accomplish that objective.[170]

The FERC rejected the DOE NOPR on January 8, 2018, concluding that DOE failed to show that existing RTO/ISO rates are unjust and unreasonable, or that the proposed remedy was just and reasonable, as required under FPA section 206.[171] The FERC relied substantially on RTO/ISO representations that no planned generator retirements are a threat to grid resilience.[172] The FERC specifically rejected the DOE's proposed 90-day fuel supply requirement for eligible payments, stating that there is no basis in either the NOPR or the record for such a requirement.[173]

2. FERC Docket No. AD18-7 – ISO/RTO and Resilience

In the same order in which it rejected the DOE NOPR, the FERC initiated new Docket No. AD18-7-000, eliciting input from RTOs/ISOs with the aim of: (1) developing a common understanding among FERC, the industry, and others of what resilience of the Bulk Power System means and requires; (2) understanding

166. Comments of FirstEnergy, *Grid Reliability and Resilience Pricing*, FERC Docket No. RM18-1-000; Comments of American Coalition for Clean Coal Electricity, *Grid Reliability and Resilience Pricing*, FERC Docket No. RM18-1-000; Comments of Peabody Energy, *Grid Reliability and Resilience Pricing*, FERC Docket No. RM18-1-000; Comments of the Illinois Coal Ass'n., *Grid Reliability and Resilience Pricing*, FERC Docket No. RM18-1-000; Comments of the West Virginia Coal Ass'n., *Grid Reliability and Resilience Pricing*, FERC Docket No. RM18-1-000; Comments of Murray Energy Corp, *Grid Reliability and Resilience Pricing*, FERC Docket No. RM18-1-000.

167. *See, e.g.*, Comments of the Environmental Defense Fund, *Grid Reliability and Resilience Pricing*, FERC Docket No. RM18-1-000; Comments of the Natural Resources Defense Council and the Sustainable FERC Project, *Grid Reliability and Resilience Pricing*, FERC Docket No. RM18-1-000.

168. *See, e.g.*, Comments of the Natural Gas Supply Association, *Grid Reliability and Resilience Pricing*, FERC Docket No. RM18-1-000; Comments of the Interstate Natural Gas Association of America, *Grid Reliability and Resilience Pricing*, FERC Docket No. RM18-1-000; Comments of ExxonMobil Power and Gas Services, *Grid Reliability and Resilience Pricing*, FERC Docket No. RM18-1-000.

169. Comments of the ISO/RTO Council, *Grid Reliability and Resilience Pricing*, FERC Docket No. RM18-1-000.

170. *See, e.g.*, Comments of the Large Public Power Council, *Grid Reliability and Resilience Pricing*, FERC Docket No. RM18-1-000.

171. FERC Grid Resilience Order, *supra* note 22, at P 15.

172. *Id.* at PP 14-16.

173. *Id.* at P 27.

how each RTO/ISO assesses resilience in its geographic footprint; and (3) determining whether additional FERC action regarding resilience is needed.[174] The FERC further proposed a definition of grid resilience, closely tracking the NIAC approach, as discussed above.[175]

The March 9, 2018 RTO/ISO filings describe highly divergent circumstances and concerns, with each region's situation a function of different generating resources, weather conditions, fuel supply and gas pipeline capacity, and geography.[176] These varied circumstances result in different emphases on the resources on which each region is focused in enhancing resilience, with some regions relatively more concerned about generation mix, whereas others are focused more so on transmission concerns, distribution and fuel supply.[177] Perceived levels of risk also vary dramatically.

For its part, ISO New England (ISO-NE) voiced significant concern over the lack of firm natural gas transportation needed to serve a generation fleet substantially dependent on natural gas-fired generation.[178] With coal and oil-fired generation having declined from 40% of its generating fleet in 2000 to 3% in 2016, and with reliance on natural gas-fired generation having increased to 49%, ISO-NE indicated that its most dramatic challenge is to meet the need for additional natural gas infrastructure (pipeline transportation and storage) to provide firm pipeline transportation capacity to generating resources now relying on interruptible natural gas supply.[179] Additional pipeline capacity is also needed to firm up deliveries from LNG facilities.[180] This shortcoming is felt particularly during cold winter periods, when competing reliance on natural gas supply for heating needs is acute. As well, the ISO-NE indicates it may endeavor to retain the limited coal and oil-based resources that the region retains, though this solution is said to be considered as an interim measure only.[181]

In marked contrast, the California Independent System Operator (CAISO) identified natural events such as earthquakes, drought and fires as its highest ranking risks, posing threats to transmission, distribution and generating facilities.[182]

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174. *Id.* at P 18.

175. *Id.* at P 22.

176. *See generally* Response of ISO New England, *Grid Resilience in Regional Transmission Organizations and Independent System Operators*, FERC Docket No. AD18-7-000 (filed Mar. 9, 2018) [hereinafter known as ISO-NE]; Response of California ISO, *Grid Resilience in Regional Transmission Organizations and Independent System Operators*, FERC Docket No. AD18-7-000 (filed Mar. 9, 2018) [hereinafter known as CAISO]; Response of Midcontinent ISO, *Grid Resilience in Regional Transmission Organizations and Independent System Operators*, FERC Docket No. AD18-7-000 (filed Mar. 9, 2018) [hereinafter known as MISO]; Response of New York ISO, *Grid Resilience in Regional Transmission Organizations and Independent System Operators*, FERC Docket No. AD18-7-000 (filed Mar. 9, 2018) [herein after known as NYISO]; Response of PJM Interconnection, *Grid Resilience in Regional Transmission Organizations and Independent System Operators*, FERC Docket No. AD18-7-000 (filed Mar. 9, 2018) [hereinafter known as PJM].

177. *See generally id*.

178. ISO-NE, *supra* note 176, at 6.

179. *Id*.

180. *Id.* at 20.

181. *Id.* at 12.

182. CAISO, *supra* note 176, at 5.

Changing weather conditions are said to pose challenges, due to the impact on the availability of renewable solar and wind resources.[183] The CAISO points out that these threats differ meaningfully from those facing its eastern RTO/ISO counterparts, where severe cold weather conditions and hurricanes are of greater concern.[184] And while the CAISO does not see an issue with resource mix, it identifies certain transmission issues in "uniquely situated areas" such as the San Francisco Peninsula, due to characteristics which include high density urban load and geographic and system configuration.[185] The CAISO reports that the system is otherwise managing a high degree of renewable integration.[186]

Working with a different resource base, the New York Independent System Operator (NYISO) commented that its fuel risk is mitigated by the diversity of in-state resources, and broad availability (84%) of dual fuel capability for natural gas-fired generating capacity.[187] The NYISO represented that generating resources secured through the competitive markets it administers meet the NERC's (N-1) planning standard, the New York's enhanced reserve requirement and increased reserve requirements that the NYISO implemented following the 2013-14 winter.[188] NYISO does not identify generation or transmission shortcomings requiring remedy.

Similarly, in comments that describe a variety of planning and events assessment tools, the Midcontinent Independent System Operator (MISO) commented that it does not face "any imminent reliability or resilience issues."[189] The list of threats to resilience compiled by the MISO includes: communications interruptions, "natural disasters, changing resource portfolio, and physical and cyber threats."[190] Significantly, while the MISO identifies its changing resource portfolio as a risk, it also indicates that the related issues are being effectively handled through a market structure, which it says optimizes needed energy and ancillary services, and through contingency planning.[191]

In turn, PJM Interconnection (PJM) described a multi-faceted risk analysis and management structure.[192] Addressing its asset base, the PJM identifies increasing reliance on natural gas pipelines as a significant risk factor calling for further coordination and analysis, and it asks for more direct planning authority to manage risk factors.[193] However, the PJM does not identify its available asset mix as itself reflecting an unmanageable risk.[194]

183. *Id.* at 78.
184. *Id*.
185. *Id.* at 48.
186. *Id.* at 81.
187. NYISO, *supra* note 176, at 31.
188. *Id.* at 6-7.
189. MISO, *supra* note 176, at 7.
190. *Id.* at 12.
191. *Id.* at 17-20.
192. *See generally* PJM, *supra* note 176.
193. *Id.* at 26-27.
194. *See generally* PJM, *supra* note 176.

Taken together, these filings make it clear that challenges, solutions and the perception of risk vary substantially across the nation. Within each RTO/ISO, an approach that considers the unique circumstances and conditions facing each region is essential. In some regions, it is certainly possible to envision new structures for compensation through markets designed to elicit needed investment meeting desirable reliability criteria. The ISO-NE is in a unique category in this respect, in view of its heavy dependence on natural gas-fired generation and the shortage of firm natural gas transportation to meet generation needs. But it would be a mistake to mandate solutions such as this across the board, in situations that are so varied. Receptivity by the FERC to such proposals on a region-specific basis will be useful, but it is difficult to see that generic solutions or additional rules would successfully weave a pattern through the dissimilar situations and conditions in which the RTOs/ISOs operate.[195]

Of note, on June 15, 2018, FirstEnergy Solutions Corp. (FirstEnergy) filed a renewed request for emergency FERC action in Docket No. AD18-7-000.[196] Additionally, it filed in Docket No. ER18-1509, a separate proceeding involving a petition filed by ISO New England seeking waiver of certain provisions of its tariff to enable it to enter into a cost-of-service agreement with a natural gas-fired generator in the ISO New England footprint for the purpose of ensuring fuel security.[197] FirstEnergy expressed support for the ISO New England's waiver request, and warned that absent "swift and decisive action" by the FERC "to preserve fuel-secure generating resource," RTOs and ISOs "will continue to see the premature retirement of needed generation and, with it, the loss of grid resilience and reliability."[198] FirstEnergy further admonished the FERC, saying that the ISO New

195. In *A Customer-focused Framework for Electric System Resilience*, submitted in FERC Docket No. AD18-7 by the National Resource Defense Council and the Environmental Defense Fund, authors Silverstein, Gramlich and Goggin emphasize the highly varied nature of the threats to grid resilience, the fact that the vast majority of system outages are the result of distribution level challenges, and limited evidence that generation and fuel supply shortages pose a security concern. They say these factors supports a multi-jurisdictional, resource and threat agnostic approach to enhancing grid resilience, varied by region and reflecting cost-benefit analysis. *See generally* A Customer-focused Framework for Electric System Resilience, *Grid Resilience in Regional Transmission Organizations and Independent System Operators*, FERC Docket No. AD18-7-000. To the contrary, in its recently-prepared report, the National Coal Council, (NCC) a Federal Advisory Committee established under DOE auspices, argues that the security attributes of coal-fired generation warrants the reform of FERC-approved compensation for generating resources in RTO/ISO markets in order to "stem the tide of plant retirements." *Power Reset: Optimizing the Existing Coal Fleet to Ensure a Reliable and Resilient Grid*, (National Coal Council Sept. 4, 2018). The NCC report was prepared at the request of DOE Secretary Perry, who invited NCC by letter dated April 7, 2018 to prepare a white paper addressing "what actions can be taken to optimize the U.S. Coal-fueled power plant fleet to it can continue to provide reliable, resilience, affordable power as part of a diverse electric generation mix, and what unique benefits does coal provide." NATIONAL COAL COUNCIL, POWER RESET: OPTIMIZING THE EXISTING COAL FLEET TO ENSURE A RELIABLE AND RESILIENT GRID, https://www.eenews.net/assets/2018/09/05/document_gw_04.pdf.

196. FirstEnergy Emergency Request, *supra* note 41.

197. *Id*. at 1.

198. *Id*. at 1-2.

England's request is a direct consequence of the FERC's "inaction and, particularly, its failure to ensure that RTO/ISO markets contain just and reasonable rules that provide adequate compensation for needed generation."[199]

B. FirstEnergy Request for DOE Action Under FPA Section 202(c)

In a March 29, 2018 letter to Secretary of Energy Rick Perry, FirstEnergy asked the DOE to issue an emergency order pursuant to FPA section 202(c)[200] finding that an emergency exists in the PJM Interconnection, L.L.C. (PJM) footprint "with respect to a threat to energy security and reliability."[201] Accordingly, FirstEnergy asked the DOE to issue an emergency order compelling PJM to enter into contracts with qualifying coal-fired and nuclear generators providing for full cost recovery for facilities that have sufficient on-site fuel to operate for 25 days at full output.[202] As discussed below, FPA section 202(c) vests in the Secretary of Energy the authority to order temporary connections of facilities, and generation, delivery, interchange, or transmission of electricity to address an emergency, such as an increase in the demand for electric energy, or a shortage of electric energy or of facilities for the generation or transmission of electric energy, or of the fuel or water for generating facilities.[203]

More specifically, FirstEnergy seeks an order directing that

> (a) certain existing nuclear and coal-fired generators in PJM . . . enter into contracts and all necessary arrangements with PJM, on a plant-by-plant basis, to generate, deliver, interchange, and transmit electric energy, capacity, and ancillary services as needed to maintain the stability of the electric grid and (b) PJM to promptly compensate at-risk merchant nuclear and coal-fired power plants for the full benefits they provide to energy markets and the public at large, including fuel security and diversity.[204]

Citing pending retirements of nuclear and coal plants that are said to threaten generation diversity, resiliency, dependability and electric security in the PJM, and historical reliance on such facilities during unusually cold periods, FirstEnergy claims that mandatory contracting and funding is essential to support grid resilience.[205] FirstEnergy further cites a recent study by the DOE's National Energy Technology Laboratory finding that the electricity demand could not have been met within the PJM without coal generation during the extreme cold.[206] FirstEnergy asked the DOE to issue an emergency order immediately, and that the order remain in effect for a minimum term of four years, or until the Secretary of Energy

199. *Id.* at 2.

200. 16 U.S.C.§ 824(c).

201. FirstEnergy Letter, *supra* note 24.

202. *Id.* at 31.

203. 16 U.S.C. § 824(c)(1).

204. FirstEnergy Letter, *supra* note 24, at 1.

205. *Id*. at 8-9.

206. *Id.* at 4-5 (citing *The Critical Role of Thermal Units During Extreme Weather Events*, Vol. 1 DOE NAT'L ENERGY TECH. LAB. at 3, 12, 16-17 (Mar. 13, 2018)).

determines that the emergency has been alleviated.[207] FirstEnergy's request remains pending before the DOE.

V. THE FERC AND THE NERC AUTHORITY UNDER THE FPA

As a statutory creation, the FERC has only such authority as is conferred by statute.[208] Similarly, the NERC, though it has a corporate existence independent of the FPA, has only such authority over responsible entities as is contemplated in FPA section 215, and conferred upon it by the FERC as the designated ERO. As noted, the FPA makes no explicit mention of resilience, leaving such authority as the FERC and the NERC have in this area a matter inference. To the extent the FERC and the NERC choose to take further action to address resilience, the core provision of the FPA under which they may take action is FPA section 215 (electric reliability). Arguably, the FERC may also take action to address resilience – or, alternatively, consider the impact of its actions on grid resilience, under FPA sections 205 and 206 (electric rates).[209] The nexus for considering resilience as a rate matter under sections 205 and 206 of the statute involves the question whether rates can be considered just and reasonable if they do not provide for a resilient grid. The scope of the FERC's and the NERC's authority under each of these provisions is considered below, along with associated limitations.

A. FERC and NERC Authority under FPA Section 215 (Reliability)

As discussed above, a substantial subset of the topics relevant to grid resilience fall within the definition of an adequate level of reliability, as defined by the NERC.[210] Under FPA section 215(c)(1), the ERO's certification by the FERC depends in part on its ability to develop and enforce reliability standards that provide for an adequate level of reliability.[211] Accordingly, the authority given the FERC and the NERC over grid reliability includes, by direct implication, authority over grid resilience.

The FERC's authority over electric grid reliability is expressly outlined only in FPA section 215, and that authority is tightly constrained to the promulgation and enforcement of reliability standards.[212] The statute does not otherwise provide the FERC with plenary authority over grid reliability, specifying that the FERC can act only through the approval and enforcement of reliability standards.[213] Section 215(b) provides that "[t]the Commission [FERC] shall have jurisdiction . . .

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207. *Id.* at 32.

208. Atlantic City Elec. Co. v. FERC, 295 F.3d 1, 8 (D.C. Cir. 2002).

209. *See generally* FPA §§ 205, 206, 16 U.S.C. §§ 824d, 824e (1978). These sections of the FPA are cited generally by certain RTO/ISO commenters in support of FERC action in this area. PJM asserts that in defining resilience, "the Commission should clarify that resilience is included in its existing statutory authority." PJM Comments, *supra* note 176, at 11. PJM cites specifically the definition of "reliable operation" under FPA section 215 and the Commission's obligation to assure just and reasonable rates (FPA sections 205 and 206). *Id.*

210. *See infra* Part V.

211. 16 U.S.C. § 824o(c)(1).

212. *Id.* § 824o.

213. *Id.* § 824o(b)(1).

.over the ERO . . . .any regional entities, and all users, owners and operators of the bulk power system . . . .*for the purposes of approving reliability standards established under this section and enforcing compliance with this section*."[214] FPA section 215 is not a general grant of authority for the FERC to take action on reliability or resilience outside its specific statutory role in the approval and enforcement of standards.

The FERC's substantive reach under FPA section 215 is further limited to the approval of standards governing grid operations and design, but not investment.[215] FPA sections 215(a)(3) and (a)(4) specify that reliability standards are to provide for the "reliable operation" of the Bulk Power System, while reliable operation is defined to mean "operating the elements of the bulk- power system . . . .so that instability, uncontrolled separation, or cascading failures of such system will not occur as a result of a sudden disturbance, including a cybersecurity incident, or unanticipated failure of system elements."[216] Section 215(a)(3) expressly states that the term "reliability standard" encompasses "the *operation* of existing bulk-power system facilities . . . .and the *design* of planned additions or modifications to [Bulk Power System] facilities to the extent necessary to provide for reliable operation of the [Bulk Power System], *but the term does not include any requirement to enlarge such facilities or to construct new transmission capacity or generation capacity*."[217] Even more pointedly, section 215(i)(2) of the statute specifies that it "does not authorize the ERO or the Commission [FERC] to order the construction of additional generation or transmission capacity or to set and enforce compliance with standards for adequacy or safety of electric facilities or services."[218]

In a further limitation under section 215(a)(1) of the statute, the term "Bulk Power System," describing the facilities and systems to which reliability standards may be addressed, expressly "does not include facilities used in the local distribution of electric energy."[219] With respect to the discussion of resilience, of course, that limitation is substantial, since the distribution facilities are on the front line with respect to disturbances associated with naturally occurring events.

B. FERC Authority Under FPA Sections 205 and 206 (Rates)

The FERC has additional authority over electric utility practices relevant to grid resilience under FPA sections 205 and 206. FPA section 205 provides that all public utility "rates and charges . . . and all rules and regulations affecting or

214. *Id*. (emphasis added).

215. 16 U.S.C. §§ 824o(a)(3), 824o(a)(3), 824o(i)(2).

216. *Id.* § 824o(a)(4). Under the NERC Glossary (part of the standards), "Disturbance" defined to include abnormal system conditions, or change in ACE that is caused by the sudden failure of generation or interruption of load. *Glossary of Terms Used in NERC Reliability Standards*, NERC (July 3 2018), https://www.nerc.com/files/glossary_of_terms.pdf.

217. *Id.* § 824o(a)(3) (emphasis added).

218. *Id.* § 824o(i)(2).

219. *Id.* § 824o(a)(1).

pertaining to such rates and charges shall be just and reasonable."[220] FPA section 206 provides, that upon a determination by the FERC that any "rate, charge, or classification, demanded, observed, charged, or collected by any public utility . . . or that any rule, regulation, practice, or contract affecting [such things] is unjust [or] unreasonable" it "shall determine the just and reasonable rate, charge, classification, rule, regulation, practice or contract thereafter observed and in force."[221] This authority was invoked by the DOE in its NOPR in Docket No. RM18-1, where it asked the FERC to find that the ostensible deterioration of grid resilience (due to the retirement of certain baseload coal and nuclear facilities) called for the FERC to implement a cost-based compensation mechanism keeping such facilities on-line.[222] In its decision terminating the DOE NOPR, the FERC did not question its authority to implement the DOE's recommended remedy, but instead determined that as a factual matter "[n]either the Proposed Rule nor the record in this proceeding has satisfied the threshold statutory requirement of demonstrating that the RTO/ISO tariffs are unjust and unreasonable."[223]

The FERC's assumption that it would have had the statutory authority to implement the DOE's recommended remedy in the FERC Docket No. RM18-1, had the FERC agreed there was evidentiary support for it, is probably correct, but bears some examination.[224] Though the DOE failed to spell out its statutory theory other than generally to cite FPA sections 205 and 206, its implied assumption is that RTO/ISO rates cannot be just and reasonable unless they support a resilient grid, as the DOE conceives of it.[225]

Though resilience is a relatively new term as used in this setting, it has been said historically that rates should be as low as possible "consistent with the maintenance of safe and reliable service."[226] Similarly, it seems reasonable to say that if the level or structure of the FERC rates is not adequate to elicit sufficient investment to provide for grid resilience, as the FERC has defined it (and certainly to the extent resilience is an element of reliability), those rates may not be just and reasonable. Implicitly, this unarticulated presumption is at the root of the FERC's recent determination in *ISO New England, Inc*.[227] There, the FERC rejected a request by ISO New England for waiver of a tariff provision enabling it to retain two retiring generating units for fuel security purposes, but simultaneously instituted a new proceeding under FPA section 206 to address regional fuel security

220. 16 U.S.C § 824d(a).

221. *Id.* § 824e(a).

222. DOE NOPR, *supra* note 19, at 46,941.

223. FERC Grid Resilience Order, *supra* note 22, at P 16.

224. *See generally Id*.

225. DOE NOPR, *supra* note 19, at 46,945.

226. *San Diego Gas & Elec. Co. v. Sellers of Energy and Ancillary Services*, 93 F.E.R.C. ¶ 61,121 at 61,379 (2000).

227. *ISO New England Inc*., 164 F.E.R.C. ¶ 61,003 (2018). It is worth noting Commissioner LaFleur's concurring opinion supporting the decision, and the institution of the section 206 proceeding, but commenting that the decision should not be read to "lend credence to a generic or national resilience need, or an approach to address that need."

concerns.[228] Citing ISO New England's contention that the loss of the generating units would place it in violation of the NERC reliability criteria, the FERC directed ISO New England either to submit tariff revisions providing for short-term, cost–of-service agreements to address the impending retirements, or show cause why the tariff filing is not needed.[229] The statutory premise underlying the FERC's section 206 action is that the FERC has the authority to direct tariff revisions ostensibly needed in order for the ISO to meet reliability criteria.

The full breadth, and limitations upon, the FERC's authority to consider non-economic factors in evaluating whether rates are just and reasonable was addressed by the Supreme Court in *NAACP v. Federal Power Comm'n.*[230] There, affirming the Commission's decision rejecting a proposal made to the Federal Power Commission (the FERC's predecessor in administering the FPA) to implement a general order compelling utilities to implement non-discriminatory employment practices, the Court held that in establishing just and reasonable rates, the range of practices within the legitimate purview of the Commission is limited to those which bear on "illegal, duplicative, or unnecessary [] costs."[231] Addressing the argument that this authority might be extended by FPA section 201(a), stipulating that "the business of transmitting and selling electric energy . . . .is affected with [the] public interest," the court held that the "public interest," as understood in the FPA, is cabined by the Act's aim of encouraging "the orderly development of plentiful supplies of electricity." [232]

With this, it seems comfortably within the FERC's authority to evaluate the justness and reasonableness of rates with an eye to ensuring that they provide a desired quality of service, whether characterized as a matter of "adequate service," "reliability" or "resilience." If, indeed, there is factual support for the proposition that the FERC-authorized rates (or a rate structure, or the structure of a market designed to set rates) are insufficient to support adequate service, it is reasonable to conclude that the rates are not just and reasonable.

How far this proposition takes the FERC will be subject to the exercise of some judgment, but the authority is not unlimited. The DOE's contention in Docket No. RM18-1 that specific RTO/ISO markets fail to support generation arguably needed in order to support grid resilience seems to be a matter squarely within the FERC's authority.[233] Of course, this does not mean that the DOE was correct as a factual matter in contending that rates are inadequate or that there is a link between the DOE's core concern – fuel security – and grid resilience.[234] Those are factual matters for the FERC's determination.

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228. *Id*. at P 1-2.

229. *Id.*; *see also ISO New England, Inc.,* 144 F.E.R.C. ¶ 61,204 at P 21 (accepting ISO New England tariff provisions designed to provide out-of-market (i.e., cost-based, not market determined) payments to ensure reliability in winter periods); *N.Y. Independent. System Operator, Inc.,* 150 F.E.R.C. ¶ 61,116 at P 2 (recognizing the use of out-of-market payments when needed).

230. NAACP v. FPC, 425 U.S. 662, 666-68 (1976).

231. *Id.* at 668.

232. 16 U.S.C. 824(a); *NAACP*, 425 U.S. at 670.

233. DOE NOPR, *supra* note 19, at 46,945.

234. *Id.*

Outside RTO/ISO energy and capacity markets, the nexus between the FERC jurisdictional rates and concerns over grid resilience is somewhat limited. Theoretically, if it were effectively argued that compensation for transmission providers undermined investment needed to provide reliable service, it might be maintained that rates are unjust and unreasonable because they conflict with the public interest in a resilient grid. But outside of this, the application of the FERC authority would seem constrained. For example, in non-RTO/ISO markets there is no real debate as to whether the FERC-approved wholesale rates are adequate to support generation investment since revenue streams associated with generation assets are largely the responsibility of state commissions and local authorities. Accordingly, there would appear to be no reasonable basis for the FERC to assert authority under FPA sections 205 and 206 over generation adequacy outside RTO markets.

It also seems a bridge too far to contend that the FERC can exercise direct control over resilience practices by, e.g., directing utilities to operate according to specific protocols, or to make specific investments arguably called for to support resilience. The FERC has the authority directly to change a "practice" affecting rates under FPA section 206 (see above).[235] And, in the exercise of this authority, the FERC has required utilities to undertake specific activities, such as regional planning and shared transmission costs under FERC Order No. 1000.[236] There, the Commission successfully argued that regional planning and investment were beneficial practices affecting rates.[237] But the issue in connection with resilience is not whether resilient practices affect rates, but rather whether rates are sufficient to support grid resilience.

Further support for the idea that the FERC lacks direct authority to mandate what might be thought of as resilient practices lies in FPA section 215.[238] Discussed above, section 215 authorizes the FERC to oversee the development and enforcement of reliability standards.[239] The FPA expressly calls for the FERC to act through the ERO in this respect, and more specifically, to act through standards that are promulgated by the ERO.[240] If one were to read into FPA sections 205 and 206 the authority on the FERC's part directly to mandate specific reliability (or resilience) practices, it would hold the potential to undermine the statutory structure envisioned by Congress in FPA section 215.

VI. DOE AUTHORITY UNDER FPA SECTION 202(C) (EMERGENCIES) AND THE DEFENSE PRODUCTION ACT OF 1950

As noted above, shortly after the FERC's rejection of the DOE NOPR, FirstEnergy petitioned the DOE to take direct action under FPA section 202(c) compelling PJM to enter into contracts with qualifying coal and nuclear facilities

235. 16 U.S.C. § 824e(a).

236. South Carolina Pub. Serv. Auth. v. FERC, 762 F.3d 41, 48 (D.C. Cir. 2014). In the case of Order No. 1000, regional planning was justified on the ground that it would reduce the overall level of transmission cost.

237. *Id.* at 49.

238. 16 U.S.C. § 824o.

239. *See generally supra* Part V.A.

240. 16 U.S.C. § 824o(d).

to provide for full cost recovery designed to keep the facilities in operation.[241] That petition remains pending as of the date of this article, though it was the subject of an apparent directive from President Trump to Secretary of Energy Rick Perry in late May, 2018 instructing the Secretary to take action to provide funding for the facilities identified by FirstEnergy.[242] A draft memorandum prepared by DOE and associated with that directive was reportedly presented to the National Security Council close to that time. The draft memorandum also included discussion of the Defense Production Act of 1950 (DPA) as a basis for this action.[243] Both FPA section 202(c) and the DPA are discussed below.

A. FPA Section 202(c)

FPA section 202(c) provides the Secretary of Energy with the authority to compel the temporary connection of facilities, including generation, when needed to address an emergency.[244] The section provides, in part, as follows:

> During the continuance of any war in which the United States is engaged, or whenever the Commission determines that an emergency exists by reason of a sudden increase in the demand for electric energy, or a shortage of electric energy or of facilities for the generation or transmission of electric energy, or of fuel or water for generating facilities, or other causes, the Commission shall have authority . . . to require by order such temporary connections of facilities and such generation, delivery, interchange, or transmission of electric energy as in its judgment will best meet the emergency and serve the public interest.[245]

As noted, FirstEnergy has argued that the recent and imminent retirements of nuclear and coal-fired generating units has created an emergency in PJM calling for an order compelling that organization to enter into supply contract with specified coal and nuclear facilities that are said to be needed in order provide needed generation diversity, reliability, resilience and fuel security.[246]

The precedent for action under FPA section 202(c) is limited, and has generally been confined to instances of actual supply shortages and the immediate consequences of natural disasters.[247] In 2000, the DOE issued a section 202(c) order requiring certain generators to provide power to the California Independent System Operator (CAISO) in the course of the California Energy Crisis, following a

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241. FirstEnergy Letter, *supra* note 24.

242. Jennifer A Dlouhy, *Trump Orders Action to Stem Coal, Nuclear Plant Shutdowns*, BLOOMBERG (June 1 2018), https://www.bloomberg.com/news/articles/2018-06-01/trump-orders-perry-to-stem-coal-nuclear-power-plant-closures-jhw8smiv.

243. 50 U.S.C. §4501 (1950), *et seq*. The draft memorandum was originally published by Bloomberg news online. *See generally* Draft DOE Memorandum, *supra* note 25.

244. 16 U.S.C. § 824a(c).

245. *Id.* § 824a(c). Though the provision refers to the "Commission," responsibility to administer this provision was transferred to the Secretary of Energy by the Department of Energy Organization Act. 42 U.S.C. § 7151(b) (1977).

246. FirstEnergy Letter, *supra* note 24.

247. DOE, *DOE's Use of Federal Power Act Emergency Authority*, https://www.energy.gov/oe/services/electricity-policy-coordination-and-implementation/other-regulatory-efforts/does-use.

finding by the CAISO that it was unable to acquire adequate supplies.[248] In August 2002, concerns regarding availability of electricity on Long Island, NY, prompted the DOE to issue an emergency order directing Cross-Sound Cable Company to operate its transmission facilities connecting Connecticut to Long Island.[249] The following year, responding to the August 14, 2003 blackout which crippled the Northeast and Upper Midwest, the DOE issued an order directing the New York Independent System Operator and ISO New England to require Cross-Sound Cable Company to operate transmission facilities for the purpose of delivering power.[250]

In response to widespread devastation caused by Hurricanes Rita and Katrina, the DOE in September 2005 issued an emergency order authorizing CenterPoint Energy to temporarily connect electricity lines to restore power to Entergy Gulf States, Inc., and various electric cooperatives and municipal customers in Texas.[251] Some days later, the DOE issued another emergency order authorizing TXU Electricity Delivery to temporarily connect and energize a line for the purposes of delivering electricity to Deep East Electric Cooperative.[252] And in September 2008, in the wake of Hurricane Ike, the DOE issued an emergency order again authorizing CenterPoint Energy to temporarily connect electricity lines to restore power to Entergy Gulf States, Inc. and various electric cooperatives and municipal customers in Texas.[253]

In 2017, the DOE acted to authorize the Grand River Dam Authority (GRDA) to operate a generating unit which, while scheduled to retire due to noncompliance with environmental regulations, was temporarily needed to provide dynamic reactive power support in the GRDA service area, due to severe weather events which caused other units operated by the GRDA to be unavailable.[254] And in June 2017, the DOE issued an emergency order allowing PJM to direct the operation of Dominion Energy Virginia's Yorktown Power Station Units 1 and 2, under strictly limited conditions for reliability purposes.[255]

It is far from certain that FirstEnergy has established an emergency of the type contemplated by FPA section 202(c). The DOE's implementing regulations

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248. DOE, ORDER PURSUANT TO SECTION 202(C) OF THE FEDERAL POWER ACT (2000), https://www.energy.gov/sites/prod/files/202%28c%29%20order%20December%2014%2C%202000%20-%20California.pdf.

249. DOE, ORDER NO. 202-02-1 (2002), https://www.energy.gov/sites/prod/files/202%28c%29%20order%20202-02-1%20August%2016%2C%202002%20-%20CSC.pdf.

250. DOE, ORDER NO. 202-03-1 (2003), https://www.energy.gov/sites/prod/files/202%28c%29%20order%20202-03-1%20August%2014%2C%202003%20-%20CSC.pdf.

251. DOE, ORDER NO. 202-05-1 (2005), https://www.energy.gov/sites/prod/files/202%28c%29%20order%20202-05-1%20September%2028%2C%202005%20-%20CenterPoint%20Energy.pdf.

252. DOE, ORDER NO. 202-05-2 (2005), https://www.energy.gov/sites/prod/files/202%28c%29%20order%20202-05-2%20September%2030%2C%202005%20-%20TXU%20Electric.pdf.

253. DOE, ORDER NO. 202-08-1 (2008), https://www.energy.gov/sites/prod/files/202%28c%29%20order%20202-08-1%20September%2014%2C%202008%20-%20CenterPoint%20Energy.pdf.

254. DOE, ORDER NO. 202-17-1 (2017), https://www.energy.gov/sites/prod/files/2017/04/f34/Oklahoma.pdf.

255. DOE, ORDER NO. 202-17-2 (2017), https://www.energy.gov/sites/prod/files/2017/08/f35/Order%20Number%20202-17-2_0_0.pdf.

indicate that actionable emergencies must be "unexpected" and that the inability of parties to agree upon economic factors that trigger a shortfall in electric supply will not be considered an emergency unless the shortfall is "imminent."[256] The regulation bears quoting in full, as follows:

> "Emergency," as used herein, is defined as an unexpected inadequate supply of electric energy which may result from the *unexpected outage or breakdown of facilities* for the generation, transmission or distribution of electric power. Such events may be the result of weather conditions, acts of God, or unforeseen occurrences not reasonably within the power of the affected "entity" to prevent. An emergency also can result from a sudden increase in customer demand, an inability to obtain adequate amounts of the necessary fuels to generate electricity, or a regulatory action which prohibits the use of certain electric power supply facilities. Actions under this authority are envisioned as meeting a specific inadequate power supply situation. Extended periods of insufficient power supply as a result of inadequate planning or the failure to construct necessary facilities can result in an emergency as contemplated in these regulations. In such cases, the impacted "entity" will be expected to make firm arrangements to resolve the problem until new facilities become available, so that a continuing emergency order is not needed. *Situations where a shortage of electric energy is projected due solely to the failure of parties to agree to terms, conditions or other economic factors relating to service, generally will not be considered as emergencies unless the inability to supply electric service is imminent.* Where an electricity outage or service inadequacy qualifies for a section 202(c) order, contractual difficulties alone will not be sufficient to preclude the issuance of an emergency order.[257]

The language of the regulation emphasizes the unexpected nature of the events to which the DOE is authorized to respond, and strongly suggests that economics and contractual difficulties are not within its purview. Underscoring these points in *Richmond Power & Light Co. v. FERC*, the D.C. Circuit held that FPA section 202(c) is intended to address "temporary emergencies, epitomized by wartime disturbances, and is *not aimed at situations in which demand for electricity exceeds supply and not those in which supply is adequate but a means of fueling its production is in disfavor*."[258] Whatever the merit of FirstEnergy's concern in the longer term as to the importance of having certain types of generation available to the grid, it is not clear that the concern rises to the level of an emergency as that term is understood in FPA section 202(c).[259] Certainly, *Richmond Power & Light* suggests the courts will cast a dim light on use of the provision to advance one form of generation or another.

It also seems clear that section 202(c) is not designed to enable the DOE to supplant the FERC's primary role as an economic regulator. By its terms, section

256. 10 C.F.R. § 205.371 (2018).

257. *Id.* (emphasis added).

258. Richmond Power and Light of the City of Richmond, Indiana v. FERC, 574 F.2d 610, 615 (D.C. Cir. 1978) (emphasis added). In *Richmond*, the court declined to fault the Commission for failing to find an emergency within the meaning of FPA section 202(c) in circumstances where the oil embargo of the early 1970 had eased, and the proposed program to substitute coal for oil-fired generation was thought to be reflect a legitimate policy choice, but not an exigency of the type contemplated by the statute. *Id.*

259. As discussed above, both the DOE in its Staff Report and NERC in its 2017 "Synopsis" suggest that any concern regarding grid resilience is longer-term in nature. DOE Staff Report, *supra* note 107, at 63, 100; NERC 2017 Synopsis, *supra* note 122, at 3-4.

202(c) authorizes the Secretary to require such generation "as in its judgement will best meet the emergency."[260] The section further provides that

> if the parties affected by such order fail to agree upon the terms of any arrangement, the Commission [DOE], after hearing held either before or after such orders take effect, may prescribe by supplemental order such terms as it finds to be just and reasonable, including the compensation or reimbursement which should be paid to or by any such party.[261]

As to compensation, the DOE's implementing regulation stipulates that rate matters will be handled by the FERC, as follows:

> In the event that the DOE determines that an emergency exists under section 202(c), and the "entities" are unable to agree on the rates to be charged, the DOE shall prescribe the conditions of service and refer the rate issues to the Federal Energy Regulatory Commission for determination by that agency in accordance with its standards and procedures.[262]

Together, the statute and the DOE's implementing regulation suggest that while the DOE is authorized under FPA section 202(c) to compel the production of power in emergency circumstances, that authority is not designed to preempt the FERC's primary authority over economic regulation. An order from the DOE compelling an RTO/ISO to enter into a cost-based agreement to purchase power from identified generators, in circumvention of the bidding and dispatch protocols through which power is otherwise purchased and sold within the RTO/ISO would certainly seem to be an economic intervention outside the contemplation of section 202(c).

B. Defense Production Act of 1950

As noted, along with FPA section 202(c), the DPA has recently been cited as a basis for the DOE to take action providing a funding mechanism for failing coal and nuclear generation. A vestige of the Cold War and Korean War eras, and built upon the First and Second War Powers Acts of 1941 and 1942, the DPA vests in the President the authority to take specific action to shore up the nation's domestic industrial base in the interest of "national defense."[263] The Act includes a policy

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260. 16 U.S.C. § 824a(c)(1).

261. *Id*.

262. 10 C.F.R. § 205.376 (2018).

263. Since its enactment, Congress has reauthorized the DPA over 50 times, with the most recent reauthorization occurring in 2014, which extended termination of the DPA by five years, from September 30, 2014, to September 30, 2019, at which time the majority of the authorities under the DPA will expire unless further reauthorized by Congress. *See generally* Jared T. Brown and Daniel H. Else, *The Defense Production Act of 1950: History, Authorities, and Considerations for Congress*, CONGRESSIONAL RESEARCH SERVICE at 1, 3-4 (Oct. 23, 2014), https://fas.org/sgp/crs/natsec/R43767.pdf [hereinafter CRS Report]. While the authorities enumerated under the DPA are afforded directly to the President, Executive Order 13603 delegated these authorities to various department and agency heads, including to the Secretary of Energy "with respect to all forms of energy." The delegation order specifies that this authority "may be used only to support programs that have been determined in writing as necessary or appropriate to promote the national defense . . . by the Secretary of Energy with respect to energy production and construction, distribution and use, and directly related activities." National Defense Resource Preparedness, Exec. Order No. 13603, 77 Fed. Reg. 16651 at Sec. 201-02 (Mar. 22, 2012); *see also* CRS Report at Table A-3 ("Delegation of Priorities and Allocations Authorities to Cabinet Secretaries"); *see*

declaration stipulating that "in order to ensure national defense preparedness, it is necessary and appropriate to assure the availability of domestic energy supplies for national defense needs."[264]

Section 101(a) of the DPA authorizes orders compelling contractual performance in specified circumstances, extending to the President the authority to:

> (1) . . . require that performance under contracts or orders . . . which he deems necessary or appropriate to promote the national defense shall take priority over performance under any other contract or order, and, for the purpose of assuring such priority, to require acceptance and performance of such contracts or orders in preference to other contracts or orders by any persons he finds to be capable of their performance, and (2) . . . allocate materials, services, and facilities in such manner, upon such conditions, and to such extent as he shall deem necessary or appropriate to promote the national defense. [265]

DPA sections 101(c)(1) and (c)(2), to the extent relevant here, further authorize the President to "require the allocation of, or the priority performance under contracts or orders . . . relating to, materials, equipment, and services in order to maximize domestic energy supplies," provided that the President finds that "such materials, services, and facilities are scarce, critical, and essential . . . to construct or maintain energy facilities." [266]

The term "national defense," in the service of which actions under the DPA can be taken, is defined in section 702(14) of the Act to mean:

> programs for military and energy production or construction, military or critical infrastructure assistance to any foreign nation, homeland security, stockpiling, space, and any directly related activity. Such term includes emergency preparedness activities conducted pursuant to title VI of The Robert T. Stafford Disaster Relief and Emergency Assistance Act [42 U.S.C. 5195 et seq.] and critical infrastructure protection and restoration.[267]

"Critical infrastructure," in turn, is defined to mean "any systems and assets, whether physical or cyber-based, so vital to the United States that the degradation or destruction of such systems and assets would have a debilitating impact on national security, including, but not limited to, national economic security and national public health or safety."[268]

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additionally DPA section (a)(2), 50 U.S.C. § 4502 (finding that actions are needed "to ensure the vitality of the domestic industrial base" "to supply materials and services for the national defense and to prepare for and respond to military conflicts, natural or man-caused disasters, or acts of terrorism within the United States." That section further finds that actions are needed "to provide for the protection and restoration of domestic critical infrastructure operations under emergency conditions.").

264. 50 U.S.C. § 4502(a)(5) (2009).

265. *Id.* § 4511(a) (2015).

266. *Id.* § 4511(c)(1)-(2).

267. National Defense Resource Preparedness, Exec. Order No. 13603, 77 Fed. Reg. 16,651, at 16,659 (Mar. 22, 2012) [hereinafter E.O. 13603]; 50 U.S.C. § 4552(14) (2017); *see generally*, Deborah F. Buckman, *Construction and Application of Robert T. Stafford Disaster Relief and Emergency Assistance Act*, 14 A.L.R. FED 2D 173 (2006) (explaining "The Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C. § 5121, also known as the Disaster Relief Act of 1974, was enacted to provide federal assistance to victims of disasters by giving money to the states which then distribute it. Usually relief is triggered by a presidential declaration of a major disaster or an emergency situation.").

268. 50 U.S.C. § 4552(2) (2009).

There is limited precedent for the exercise of this authority in connection with energy resources, and none involving an intervention in electricity markets. In 2001, the DOE employed delegated authority under DPA Section 101(c) to require the sale of natural gas by designated suppliers to electric utilities in California in order to prevent anticipated widespread blackouts.[269] In a January 19, 2001 memorandum to the Secretary of Energy, President Clinton found that:

> natural gas supplies within . . . California are scarce, critical, and essential within the meaning of the [DPA], and . . . assuring maintenance of natural gas supplies to those regions of California cannot reasonably be accomplished without use of these authorities and is necessary and appropriate to maximize domestic energy supplies (including electricity) and to promote the national defense.[270]

Responding to that finding and the associated Presidential directive, then-Secretary of Energy Bill Richardson authorized Pacific Gas and Electric Company ("PG&E") to "make emergency purchases of natural gas" from certain identified suppliers, "to meet the high-priority uses on its system ."[271] The Secretary's order specified that the sales would take place under the terms of preexisting contracts, and that the natural gas would be "for high-priority uses, including the generation of electric power"[272]

Whether and how the DPA might be employed in addressing issues related to grid resilience is uncertain as of this date. The draft the DOE memorandum mentioned above makes a case for the exercise of this authority in support of funding for certain coal and nuclear facilities (unspecified in the draft), on grounds of grid vulnerability associated with loss of fuel security and the nexus to national defense.[273] The case for concern over fuel security is much the same as made by the DOE in support of the RM18-1 FERC NOPR (retiring coal and nuclear facilities threaten grid resilience).[274] The case for the connection to national defense rests on two core assertions, *viz.*, that (1) the Department of Defense generally relies on the commercial power grid and is threatened in much the same way as the economy generally; and (2) civilian nuclear infrastructure is an element of the nation's ability to influence nuclear developments world-wide, including its influence on military developments abroad and non-proliferation agreements.[275] The

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269. *Id.* § 4511(c); CRS Report, *supra* note 265, at 8-9; *The California Energy Crisis and Use of the Defense Production Act: Hearing Before the S. Comm. on Banking, Housing, and Urban Aff.*, 107th Cong. 62-78 (2001), https://www.hsdl.org/?view&did=443684 [hereinafter S. Comm. Rept.].

270. S. Comm. Rept., *supra* note 269, at 64.

271. *Id.* at 62 (discussing DOE, TEMPORARY EMERGENCY NATURAL GAS PURCHASE AND SALE ORDER (Jan. 19, 2001)). The Secretary of Energy's emergency order took effect immediately, and expired on January 24, 2001. *Id.*

272. *Id.* at 62-63. Under the terms of the emergency order, is PG&E and a supplier fail to reach agreement as to contractual terms of the purchase, sale and delivery of gas under the order, the Secretary of Energy will set such terms.

273. Draft DOE Memorandum, *supra* note 25, at 3.

274. DOE NOPR, *supra* note 19, at 46,943.

275. Draft DOE Memorandum, *supra* note 25, at 21-25.

DOE draft memorandum also makes the claim that action under DPA section 101(c) does not require a nexus to national defense.[276]

Whether those claims are sustainable is, in the first instance, a factual matter. Certainly, the RTO/ISO filings in the FERC Docket No. AD18-7, discussed above, support the view that the electric grid's vulnerability to fuel supply interruption is limited to specific geographic regions, including New England and possibly PJM (though PJM itself does not itself see this as an imminent threat). So limited, there is then the ensuing question whether there is a legitimate nexus between the fuel security concern and national defense. To the extent the national defense issue relates to service to military facilities generally, the nexus seems attenuated, at a minimum calling for more specific analysis than is available in the public record regarding the military installations served by the grid in vulnerable regions, their criticality, and the electric supply options they possess.[277]

The argument that civilian nuclear facilities must be preserved in order to preserve the nation as a preeminent nuclear power also seems stretched. The nuclear facilities for which the DOE seeks protection are older, uneconomic in the long run, and by any calculation likely to be in operation for a limited number of years only. If, indeed, the nation's strategic military and diplomatic objectives include prominence in civilian nuclear matters, a more thoughtful, long-term strategy for the development of next-generation facilities seems a far more appropriate focus for discussion.

It also seems questionable, as a matter of statutory construction, to claim, as the DOE draft memorandum does, that action under the DPA need not rest on a concern over national defense at all . The DOE draft memorandum makes this claim on the strength of the prefatory language to the authority granted the President in DPA section 101(c).[278] According to the memorandum, "[t]he authority under section 101(c) may be exercised '[n]otwithstanding any other provision of this Act,' and is therefore not subject to the 'national defense' requirement of § 101(a)."[279] That prefatory language seems a thin reed for the argument that actions under the DPA may be taken regardless of a nexus to national defense. Indeed, the entirety of the DPA is about national defense, while the specific measures authorized to protect the industrial base are directly tied to the Act's opening finding

276. Discussed below, this claim rests on the assertion (Draft DOE Memorandum, *supra* note 25, at 35) that the prefatory language to the authority granted the President to order "the allocation of or priority performance under contracts or orders . . . specifies that it is granted 'notwithstanding any other provision'" in the Act. ("The authority under section 101(c) may be exercised '[n]otwithstanding any other provision" of this Act,' and is therefore not subject to the 'national defense' requirement of § 101(a).").

277. It is worth noting that for purposes of the emergency operational authority invested in DOE under the FAST ACT, DOE was directed to identify specific "defense critical electric infrastructure" warranting specific protection. The draft DOE memorandum asserts generally that the civilian electric grid is critical to the defense department, but makes no further effort to identify assets of specific strategic or defense importance. 16 U.S.C. § 824o-1.

278. Draft DOE Memorandum, *supra* note 25, at 21-25.

279. *Id.*

that the industrial base plays a critical role in "supply[ing] materials and services for the national defense."[280]

Closely related to these questions is the same policy matter raised by FirstEnergy's invocation of FPA section 202(c) – whether recourse to DPA in these circumstances would undermine the primary statutory authority that Congress has invested in the FERC and the NERC to oversee electric market and reliability matters.[281] As to the FERC's primary economic regulatory authority – and to the extent it is proposed that the DPA be employed to provide a pricing mechanism supporting specified generating resources – the DPA itself would appear to guard against this recourse. DPE section 106 specifies that "energy" shall be designated as a "strategic and critical material," a determination that, in turn provides the President with additional powers under DPA Title III to take steps to encourage the "exploration, development, and mining of" such "critical and strategic materials."[282] However DPA section 106 appears further to prohibit the President's intervention in matters related to economic regulation, specifying that

> no provision of this chapter shall, by virtue of such designation [of energy as a 'strategic and critical material'] grant any new direct or indirect authority to the President for the mandatory allocation or pricing of any fuel . . . (including, but not limited to, crude oil, residual fuel oil, any refined petroleum product, natural gas, or coal) or electricity or any other form of energy.[283]

VII. NATURAL GAS ACT

Interstate natural gas pipeline infrastructure is clearly implicated in the electric grid resilience discussion. The nation's increasing cross-regional reliance on natural gas resources for electric generation, responding to increasing availability and declining prices, has put pressure on existing pipeline facilities across the nation.[284] In its Synopsis of the NERC Reliability Assessments, the NERC highlights that a "[g]rowing reliance on natural gas continues to raise reliability concerns regarding the ability of both gas and electric infrastructures to maintain the BPS reliability at acceptable levels."[285] The NERC's concern is animated by its observation that for the most part "natural gas generation is fueled using just-in-time transportation," and as a result "[r]oughly 50 percent of natural gas generation resources are considered interruptible, and in constrained natural gas markets these units are not expected to be served during peak pipeline conditions."[286] The NERC further observes that while discussion regarding the interface between, and dependencies among, the natural gas and electric utility systems has quickened, "in-

280. 50 U.S.C. § 4502(a)(1).

281. FirstEnergy Emergency Request, *supra* note 41, at 1, 3, 7-8.

282. 50 U.S.C. § 4533(a)(1)(B) (2014).

283. *Id.* § 4516 (2009).

284. *See generally* NERC 2017 Synopsis, *supra* note 122, at 1.

285. *Id*.

286. *Id*. at 4.

sufficient progress has been made reconciling the planning approaches and operating practices . . . between these two inter-linked sectors."[287] On this basis, NERC identified as a key finding in its Synopsis that "[h]igher reliance on natural gas exposes electric generation to fuel supply and delivery vulnerabilities, particularly during extreme weather conditions."[288]

In New England, the issue has grown acute, as heavy reliance on a highly stressed pipeline infrastructure poses a dramatic challenge to the region's electric grid. In comments filed with the FERC in its Grid Resilience docket, the ISO New England ("ISO-NE") highlighted the region's fuel security challenge.[289] According to ISO New England, "[c]hallenges with fuel procurement, transportation and storage are most acute with natural gas, on which the regional power system is increasingly dependent for power generation."[290] ISO-NE notes that pipeline capacity in the region is generally under contract to local distribution companies, which use the fuel primarily for residential heating.[291] That leaves far less than optimal pipeline capacity for natural gas-fired power plants which typically rely on capacity released in the secondary market, on an "as available" basis.[292] Though these issues have been before the FERC in connection with ongoing study of needed gas-electric coordination, and natural gas-electric "interdependencies," ISO-NE's comments in Docket No. AD18-7 make it plain that the region faces a significant resilience problem calling for prompt intervention.[293]

With this as a backdrop, there is good reason for FERC to look at its responsibilities in administering the Natural Gas Act ("NGA") with an eye toward enhancing electric grid resilience where needed. The NGA rests on Congress' judgment that "the business of transporting and selling natural gas for ultimate distribution to the public is affected with the public interest."[294] In *NAACP v. FPC*, *supra*, in explaining the breadth of that term in its statutory context, the Court cited favorably an earlier decision addressed to the Interstate Commerce Act.[295] It stated that "the term 'public interest' . . . has direct relation to [the] adequacy of transportation service, to its essential conditions of economy and efficiency, and appropriate provision and best use of transportation facilities."[296] It certainly would

287. *Id*. at 1.

288. *Id*. at 3.

289. Response of ISO New England, Inc., FERC Docket No. AD18-7-000 at 5-8 (filed Mar. 9, 2018), https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=14837909.

290. *Id*. at 5.

291. *Id*. at 5-6, 21.

292. *Id*. at 5-6.

293. *See, e.g.*, *Communication of Operational Information Between Natural Gas Pipelines and Electric Transmission Operators*, Order No. 787, 145 FERC ¶ 61,134 at P 2 (Nov. 15, 2013), *order on reh'g*, 147 FERC ¶ 61,228 (Jun. 16, 2014); *Coordination of the Scheduling Processes of Interstate Natural Gas Pipelines and Public Utilities*, 151 FERC ¶ 61,049 (Apr. 16, 2015); *Standards for Business Practices of Interstate Natural Gas Pipelines; Coordination of the Scheduling Processes of Interstate Natural Gas Pipelines and Public Utilities*, 153 FERC ¶ 61,061 (Oct. 16, 2015).

294. 15 U.S.C § 717(a) (2005).

295. *NAACP*, 425 U.S. 662 at 669-70.

296. *Id*. at 669 (citing New York Cent. Securities Corp. v. United States, 287 U.S. 12, 25 (1932)).

appear to be in the public interest for the Commission to look at its responsibilities in administering the NGA with an eye toward its interest in assuring that the electric grid remains resilient.

How electric grid resilience may play out as a factor in the FERC's consideration of issues arising under the NGA is beyond the scope of this piece. Under NGA section 7(c), the Commission is authorized to grant certificates for new gas pipeline facilities upon application, and make a determination that the facilities are warranted by the "public convenience and necessity."[297] NGA section 7(a) provides that FERC "may by order direct a natural-gas company to extend or improve its transportation facilities" if it "finds such action necessary or desirable in the public interest."[298] It is certainly conceivable that in considering the construction of new facilities, electric grid resilience would be a factor in determining whether they are in the public interest or warranted by the public convenience and necessity. This authority may be particularly useful in ISO-NE, for reasons discussed above. Also conceivable is the possibility that the Commission may consider the impact on grid resilience of rate proposals under sections 4 and 5 of the NGA.[299]

VIII. A PITCH FOR THE PRIMARY ROLES FOR FERC AND NERC AND A HOLISTIC APPROACH TO GRID RESILIENCE

The FERC's decision rejecting the DOE NOPR and its decision in Docket No. AD18-7 to elicit individual ISO/RTO filings addressing grid resilience suggests that the agency is prepared to address the fuel security issue that gave rise to the DOE NOPR on a region-specific basis.[300] For reasons discussed above, this is the right call. Yet, that decision (assuming it is not revisited) adds obvious pressure for the DOE to step in under either FPA section 202(c) or the DPA. While we do think that the DOE has an important role to play in organizing a national response to enhance grid resilience, we do not think that DOE's preemption of the FERC's and the NERC's roles would be wise.

As discussed above, the FERC and the NERC have substantial statutory authority and responsibility to address matters related to grid resilience under FPA sections 215, 205 and 206. There is much to commend the exercise of this authority as compared with intervention by the DOE. Two features of the NERC model recommend the NERC as a primary forum for consideration of issues related to grid resilience. The first follows from the NERC's administration of the ANSI-approved stakeholder process for developing reliability standards. Pursuant to this process, as approved by the FERC, representative industry stakeholders, with input from the FERC and the NERC staff, are principally responsible for standards development.[301] Participation in the standards development process by technically expert industry representatives helps ensure that the standards are technically sound and that an eye is directed toward their practicability.

297. 15 U.S.C. § 717f(c)-(f) (1988).

298. *Id.* § 717f(a).

299. 15 U.S.C. § 717c (2005); 15 U.S.C. § 717d (1938).

300. *See* FERC Grid Resilience Order, *supra* note 22.

301. 16 U.S.C. § 824(c), (d).

The second important and relevant element of the NERC model lies in the statutory directive that NERC standards provide for an "adequate level of reliability."[302] Discussed above, the concept of an adequate level of reliability carries with it an implicit element of reasonableness and cost-benefit analysis. This must be an important element of the resilience discussion, and it is a topic to which DOE is not particularly well-suited.

The FERC's regime for exercising of its responsibilities under FPA sections 205 and 205 - also relevant to the resilience discussion, as discussed above - carries with it some similar critical characteristics. Implicit in the FERC's statutory responsibility to ensure just and reasonable rates is an obligation to balance economic and reliability (resilience) concerns. The FERC does this in a setting bounded by due process and with the oversight of the court system.

It may be, as some have argued, that the NERC and the FERC have been too constrained in their willingness to address low-probability, high impact events under FPA section 215. But, as discussed above, this is not a structural issue. The FERC's directive that the NERC take action to implement the GMD standard may pave the way for more activity in this area, bounded by the NERC's ANSI-approved standards development process. Similarly, it may be reasonably argued that RTO-administered, FERC-approved market structures do not elicit adequate investment in generation with specific essential reliability characteristics needed to support a resilient grid. But this concern too is remediable under existing processes, and subject to the FERC's obligation to balance a range of interests in reworking pricing signals and market structures.

In marked contrast, the DOE lacks the breadth of statutory responsibility, the expertise, and the procedural machinery to effectively substitute its authority for regulation by the FERC and the NERC. As to its substantive responsibility, while the DOE certainly has a statutorily prescribed role to play in connection with emergencies affecting the electric grid, it does not have the wide-angle regulatory responsibility needed to manage the myriad of considerations relevant to economic and reliability regulation generally. Nor does it have processes in place that are designed to elicit and process stakeholder input effectively. Under statute, the FERC is an independent, adjudicative body, and its regulatory structure provides for extensive process supporting decisions based on substantial evidence.[303]

This is not to say that the DOE does not have an important, indeed mandatory, role to play in connection with grid emergencies, and in support of national defense and security under FPA section 202(c), the DPA and other specific statutory authority. The DOE is the Sector Specific Agency (SSA) under Presidential Policy Directive 21, responsible for coordinating other federal agencies (including the Department of Homeland Security and FERC) and establishing priorities that will

302. *Id.* § 824o(c)(1).

303. *See generally FERC Rules of Practice and Procedure*, 18 C.F.R. §§ 385.101-.2202 (2017).

advance grid security.[304] Further, under FPA section 215-1, at the President's direction, the Secretary of the DOE is responsible for taking emergency action to protect and restore the electric grid following identification of a grid security emergency.[305] In addition, the DOE is chair of the Energy Sector Government Coordinating Council (EGCC), organized under the authority of the National Infrastructure Protection Plan for the purpose of coordinating federal activities in support of the nation's energy security and resilience.[306] Among its functions, the EGCC serves to coordinate governmental and private sector activity regarding electric sector security through cooperation with the Electricity Subsector Coordinating Council (ESCC).[307] The Secretary of Energy is a member of the National Security Council, as well.[308]

With that said, the DOE is not a regulatory agency. In exercising those specific statutory responsibilities it has been given, it must take care not to tread needlessly on regulatory responsibilities clearly assigned to the FERC or the NERC. The economic and reliability risk of overstepping these boundaries is substantial, with some arguing that an effort on the DOE's part to interject into the FERC markets effectively subsidized resources through mandatory cost-based compensation would effectively "blow up" the markets.[309] Though that rhetoric may be somewhat hyperbolic, the point that market intervention is not the DOE's strong suit, and that there may well be unintended consequences, is well-placed and counsels the DOE to proceed cautiously.

What role should the DOE play? Of course, in the presence of a genuine emergency, the DOE is authorized to, and should, take appropriate action. But, the authority should be exercised sparingly. Choices regarding generation resource mix with effects that may (or may not) impact grid reliability and resilience many years from now do not present an obvious case for the DOE intervention.

Further, the DOE has an invaluable role to play in facilitating study of the many factors that impact grid resilience, and in assisting federal governmental partners, the electric industry, and state and local authorities in working toward a

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304. Critical Infrastructure Security and Resilience, PRESIDENTIAL POLICY DIRECTIVE PPD-21, at 6-7 (Feb. 12, 2013), https://obamawhitehouse.archives.gov/the-press-office/2013/02/12/presidential-policy-directive-critical-infrastructure-security-and-resil.

305. 16 U.S.C. § 824o-1.

306. *National Infrastructure Protection Plan*, U.S. DEPARTMENT OF HOMELAND SECURITY (Oct. 3, 2018), https://www.dhs.gov/national-infrastructure-protection-plan.

307. *Electricity Sub-Sector Coordinating Council Charter*, U.S. DEPARTMENT OF HOMELAND SECURITY (Aug. 5, 2013), https://www.dhs.gov/publication/energy-sector-council-charters. The EGCC and the ESCC were organized following issuance of Homeland Security Presidential Directive 7 (2003), which tasked the Department of Homeland Security with overall responsibility to organize public and private partnerships with the aim of protecting critical infrastructure. Presidential Directive 7 also designated DOE as the "Sector Specific Agency" with general responsibility for electric sector infrastructure security matters. *See generally Homeland Security Presidential Directive 7: Critical Infrastructure Identification, Prioritization, and Protection*, U.S. DEPARTMENT OF HOMELAND SECURITY (Sept. 22, 2015), https://www.dhs.gov/homeland-security-presidential-directive-7.

308. 50 U.S.C.§ 3021(c)(1) (2018).

309. *See generally How DOE's Baseload Power /rule "Would Blow the Market Up,"* UTILITY DRIVE (Oct. 2, 2017), https://www.utilitydive.com/news/how-does-baseload-power-rule-would-blow-the-market-up/506269/.

coordinated response to the many risks faced by the grid and in helping to judge the most cost-effective solutions. As explained at length above, resilience is a concept that cuts across state and federal jurisdictional lines, and has different jurisdictional implications depending on the nature of the wholesale marketplace in various regions of the county. As explained by the NAS in its Resilience Report, the DOE is uniquely positioned to assist in this work, given its wide-angle perspective and cross-sector mission.[310] The development of a national plan, pointing the way to the best solutions at each of the relevant levels of authority would be an enormous public service.

IX. CONCLUSION

The resilience of the electric grid, as the FERC proposes to define it, is important. Increasingly violent weather, the ever-evolving nature of cyber threats, and the critical role that electric service plays in supporting the nation's welfare and economic well-being counsel us to give thoughtful and prompt consideration to the measures that should be taken to support a resilient grid.

The diffusion of responsibility over the electric grid, and the dramatically different challenges faced in each region of the country call for a multi-faceted and nuanced response to the resilience challenge, recognizing the varied jurisdictions in play, the different nature of the challenge in different regions and substantial scope and limitations of each of the potentially relevant authorities.

The FERC and the NERC have vital roles to play in advancing grid resilience, though they do not have complete authority in the area. The FERC and the NERC are encouraged to step up to the challenge, recognizing that the critical role these organizations play in balancing stakeholder interests and providing for due process may be lost if more unilateral executive action overtakes these organizations.

Active DOE intervention at this time runs the risk of substantially disrupting the regulatory framework assigned by Congress to the FERC and the NERC. Having said that, there is an important role for the DOE in organizing the disparate agencies with authority in this area to address resilience on a holistic and cost-effective basis.

310. *Enhancing Resilience*, *supra* note 38, at 3-7, 15.