UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Grid Reliability and Resilience Pricing	**)**	**RM18-1-000**

COMMENTS OF THE ADVANCED, RENEWABLE AND STORAGE ENERGY INDUSTRY ASSOCIATIONS

Pursuant to the Federal Energy Regulatory Commission's ("Commission" or "FERC") October 2, 2017, Notice Inviting Comments,[1] the Advanced Energy Economy,[2] American Council on Renewable Energy,[3] American Wind Energy Association,[4] Energy Storage Association,[5] Geothermal Energy Association,[6] and Solar Energy Industries Association[7] (collectively, "Advanced, Renewable and Storage Energy Industry Associations") hereby respectfully submit these comments on the Notice of Proposed Rulemaking ("NOPR")[8] proposed by the Secretary of Energy ("Secretary") for action by the Commission, under section 403 of the Department of Energy Organization Act,[9] and docketed by the Commission in the above-captioned proceeding. These comments complement the Joint Industry Comments Opposing the DOE NOPR submitted in this docket, underscoring some of the positions set forth in those comments and focusing on issues presented by the NOPR that are of particular relevance for the advanced energy industries

[1] Federal Energy Regulatory Commission, *Grid Reliability and Resilience Pricing*, Notice Inviting Comments (Oct. 4, 2017) (hereinafter "NOPR").
[2] Advanced Energy Economy is a national association that advocates for the adoption of a wide variety of advanced energy technologies, including energy efficiency, demand response, energy storage, natural gas electric generation, solar, wind, hydro, nuclear, electric vehicles, biofuels and smart grid.
[3] American Council On Renewable Energy is a national non-profit organization that represents the entire spectrum of renewable energy technologies, consumers and investors.
[4] American Wind Energy Association is the national trade association that represents the interests of the nation's wind energy industry.
[5] The Energy Storage Association is the national trade association promoting the adoption of competitive and reliable storage systems for electric service.
[6] The Geothermal Energy Association is a trade association composed of U.S. companies who support the expanded use of geothermal energy.
[7] The Solar Energy Industries Association is the national trade association of the U.S. solar energy industry.
[8] 82 Fed. Reg. 46,940 (Oct. 10, 2017).
[9] 42 U.S.C. § 7173 (2012).

and technologies that the undersigned represent.[10] For the reasons set forth in those comments and described below, we respectfully urge the Commission to not adopt the NOPR, and to instead engage in a more comprehensive effort to assess resilience and improve price formation.[11]

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[10] *Joint Industry Comments Opposing the DOE NOPR*, Docket No. RM18-1-000 (Oct. 23, 2017).
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I. INTRODUCTION AND EXECUTIVE SUMMARY

The nation's existing bulk power system has proven to be reliable and resilient, even as market forces have resulted in an evolution in our generation mix. There are few things more important than maintaining an uninterrupted supply of power under all circumstances, and the goals of enhancing grid reliability and resilience[12] are essential ones. The actual proposal that has been put forward by the Department of Energy ("DOE") here, however, would not achieve any reliability or resilience objectives.

Instead, it would distort wholesale markets by providing out-of-market compensation to a significant amount of electric generation resources—largely if not exclusively coal and conventional nuclear generation—that would otherwise retire in response to market forces. This result would lead to a grid that is significantly less reliable, resilient and flexible, all while imposing massive new costs on consumers and discriminating against flexible, reliable, clean,

[12] The foundation of the NOPR is DOE's claim that the "resilience" of the electric grid is under imminent threat from market-driven changes in the resource mix. While the NOPR uses the term "resilience," it never provides an explicit definition of what that term means and what it encompasses, nor points to any definition of resilience offered by another source. This failure to clearly define what is meant by resilience seriously undermines the NOPR's implicit assertion that the current RTO/ISO markets are unjust and unreasonable because they fail to compensate a subset of electric generating capacity for supporting grid resilience.

advanced energy technologies that provide the very reliability and resiliency benefits sought in the NOPR.

Under section 206 of the Federal Power Act ("FPA"), before proceeding to impose new rates or market rules, the Commission must first determine that the existing rates and market rules on file are not just and reasonable.[13] The NOPR provides no basis for making this critical threshold finding. The justification for the proposed preferential payments in the NOPR—that there is a reliability and resilience "emergency" caused by a failure to preserve uneconomic generating resources with 90 days of on-site fuel supply—lacks any evidentiary support. The studies and evidence cited in the NOPR, including reports by DOE staff, the North American Electric Reliability Council ("NERC") and IHS Markit, all reach the opposite conclusion. Moreover, reams of additional publicly available analyses from the grid operators themselves and independent sources contradict the assertion that there is a reliability and resiliency emergency.

Further, there is no evidence demonstrating that a failure by RTOs/ISOs to subsidize resources with 90 days of on-site fuel will cause additional disruptions in service during severe weather events or otherwise. Indeed, there is substantial evidence showing that electric systems have continued to operate in a manner that is both reliable and resilient even as resources with on-site fuel supply have retired. In reality, a range of services are needed for electric reliability, and the coal and conventional nuclear resources targeted for special treatment by this rule fail to provide many of those services, even during major grid events. Most notably, during the Polar Vortex event (a central piece of evidence relied on in the NOPR) and similar events, on-site fuel supplies have not prevented operational failures—equipment failures, frozen and waterlogged coal piles and nuclear safety concerns have all caused these resources to shut down during such events.

[13] 16 U.S.C. § 824e.

The NOPR also fails to provide substantial evidence in support of its implicit claim that regional transmission organizations ("RTO") and independent system operators ("ISO") markets do not adequately protect reliability or resilience through existing market mechanisms and features, and thus provides no basis for finding those existing provisions to be unjust and unreasonable (which would be required to adopt the NOPR's proposal). In fact, the NOPR fails to acknowledge the many ways the existing markets seek to provide incentives or failsafe measures to ensure reliability and resilience.

The NOPR fails to acknowledge, for example, the market response to the high prices experienced during the Polar Vortex that prevented a similar event from occurring the very next winter. The NOPR also disregards the important role of the states—enshrined in the FPA—in ensuring resource adequacy. Further, the NOPR fails to explain why existing provisions like Reliability Must Run ("RMR") procedures are inadequate to ensure that specific "fuel secure" resources needed to maintain reliability are retained.

Even if the NOPR were to demonstrate a reliability or resilience emergency in need of a solution, the proposal to provide a preferred set of resources with full out-of-market cost-of-service compensation has not been shown to be just and reasonable and not unduly discriminatory. Specifically, the NOPR would reregulate certain preferred coal and conventional nuclear resources located within RTOs/ISOs that have energy and capacity markets, removing those resources from the discipline of the market and providing them with guaranteed cost of service (plus a return on investment) payments. Such a result is *per se* unjust and unreasonable, and would unravel decades of FERC-backed efforts to establish competitive markets and ensure just and reasonable rates.

Relying on wholesale competition to ensure just and reasonable rates has been national policy for nearly four decades. With the strong support of Congress and Presidents of both parties,

the Commission has consistently and diligently worked to facilitate and improve competitive power markets, and those markets have, in turn, delivered enormous cost savings for consumers and innovation while also ensuring a reliable supply of energy. Competitive markets have attracted investment in new and existing resources and they have encouraged more efficiency, reliability and resilience. For example, according to PJM's 2015/2016 Value Proposition, PJM's Reliability Pricing Model capacity market enables less efficient generation resources to retire and be replaced with more efficient, less-costly plants resulting in $600 million in annual savings.[14] The organized competitive markets that have resulted from this policy have been built upon the principle that the best way to ensure the investment and innovation that is essential to a reliable and resilient power system is to have free and open competition.

Under the NOPR, competitive markets would be threatened, as assets with guaranteed rate recovery could suddenly comprise a large portion of the "deregulated" market. With guaranteed rate recovery, these re-regulated assets could distort markets and crowd out the remaining competitive generation resources, which could become uneconomic. Such a result would cause significant uncertainty in capital markets and risk continued investment in a wide variety of resources in the organized markets, eroding the reliability and resilience contributions of non-chosen resources.

Further, the NOPR comes with a high price tag for consumers, estimated as being higher than $10 billion annually in perpetuity,[15] above and beyond the billions of dollars in harm the proposal would cause to consumers and reliability by undermining competitive markets. The NOPR fails to analyze these potential costs, or make any demonstration that such costs will be

[14] PJM, *PJM Value Proposition*, (last visited Oct. 23, 2017) *available at* http://www.pjm.com/about-pjm/value-proposition.aspx.
[15] *Supra* section I.B.2.c.

outweighed by reliability and resilience benefits. The NOPR's failure to define resilience, or offer any metrics under which it can be assessed, prevents the Commission from reaching any conclusion that the NOPR's proposed compensation scheme is just and reasonable.

Moreover, the proposed preferential treatment for coal and conventional nuclear resources—the only assets that the NOPR appears intended to benefit—would violate the Commission's statutory mandate to ensure that rates and market rules are not unduly discriminatory or preferential. These comments emphasize that wind, solar, energy storage, and demand response, as well as other non-chosen resources, like natural gas, can all provide the essential reliability services that the NOPR claims are urgently needed. The NOPR fails to even acknowledge these potential contributions. In short, Commission finalization of the NOPR would amount to undue discrimination and preference.

This is not meant to suggest that improvements to organized markets to improve reliability and resilience could not be made, or should not be considered. We have long supported, and will continue to support, efforts to improve the organized competitive markets and to ensure that they are efficiently delivering the reliability that system operators need and consumers deserve, and that they provide a platform for all technologies to compete to provide such services.

To the extent the Commission concludes there may be reliability and resilience concerns that warrant examination, or that resilience and reliability attributes are not being adequately compensated by the existing markets, we encourage the Commission to consider those issues in a thorough process. As explained below, a deliberative process will require the Commission to conduct additional proceedings to define what is meant by "resilience," to assess how it could be different among regions, and to determine how it can be improved or enhanced in a manner that is just and reasonable and not unduly discriminatory or preferential. The key will be for any reforms

considered to continue to be market-based and technology neutral, and based around providing the full range of reliability services that are actually needed for reliable operation of the power system.

The Commission should also complete its work in ongoing dockets that address many of the issues raised in the NOPR, including the ongoing price formation rulemakings. Adopting final rules on issues such as fast-start pricing will provide immediate grid reliability benefits and ensure that the organized markets continue to adapt to changes in the generation mix.

While we look forward to working with the Commission on any additional deliberative procedures it deems necessary related to consider reliability and resilience, the mere pendency of this NOPR will have a chilling effect on resource investment in the organized wholesale markets due to the uncertainty it will create for the future of competitive markets. This uncertainty will, in turn, stifle innovation and increase costs borne by consumers. Therefore, we encourage the Commission to take immediate steps to dismiss this rulemaking and reassure investors in organized markets that it does not intend to rush into abandoning the competitive markets fostered by its predecessors.

II. COMMENTS

While DOE may propose a rule for action by FERC, the Commission retains independent jurisdiction and discretion to change the proposed rule or abandon it altogether.[16] Since there is no evidence to conclude that a reliability or resilience emergency has rendered the existing

[16] The final determination about what to do with a NOPR proposed by DOE rests entirely with the Commission. Section 403(b) gives the Commission "exclusive jurisdiction with respect to any proposal made under subsection [403](a)." In fact, the act spells out the Commission's independence. Specifically, section 401 (d) states that FERC, in carrying out its functions under the act, "shall not be responsible to or subject to the supervision or direction of any officer, employee or agent of any other part of" DOE. 42 U.S.C. 7172(g). The act also expressly provides that "[t]he decision of the Commission involving any function within its jurisdiction . . . shall not be subject to further review by the Secretary." *Id.*

organized market tariffs unjust and unreasonable, and the NOPR has not been shown to be just and reasonable and not unduly discriminatory or preferential, the Commission must reject it.

A. The NOPR Fails to Demonstrate that There is a Reliability or Resilience Emergency that Renders the Existing RTO/ISO Tariffs Unjust and Unreasonable

Section 206 of the FPA[17] requires that FERC must first determine that existing RTO/ISO tariff provisions are unjust and unreasonable before it can change them.[18] If a proposal can overcome that first hurdle, it then must establish that its remedy is just and reasonable and not unduly discriminatory.[19] Both elements of FERC's dual burden must be met by "principled and reasoned" analysis "supported by the evidentiary record."[20] For the reasons discussed further below, the proposal does not carry its burden to show that existing rates are unjust, unreasonable, unduly discriminatory, or preferential, and that the newly proposed rates are just and reasonable and not unduly discriminatory.

The Commission's typical practice when it proposes to change rates is to develop extensive factual findings to support its determination that existing rates are unjust and unreasonable.[21] The Administrative Procedures Act mandates such a practice, as it requires that agency determinations must not be "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law" and that its findings must be supported by "substantial evidence."[22] Only after that evidentiary

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[17] 16 U.S.C. §824e.
[18] *See, Emera Maine v. FERC*, 854 F.3d 9, 21, 24-25 (D.C. Cir. 2017) ("*Maine*").
[19] *See Algonquin Gas Transmission Co. v. FERC*, 948 F. 2d 1305, 1308 (D.C. Cir 1991) (articulating FERC's two-part burden); *see also California Independent System Operator Corporation v. FERC*, 372 F.3d 39, 398-99 (D.C. Cir. 2004); *Atlantic City Electric Company v. FERC*, 295 F.3d 1, 10 (D.C. Cir. 2002).
[20] *Maine, 854* F.3d at 24-25 (quoting *S. Cal. Edison Co. v. FERC*, 717 F.3d 177, 181 (D.C. Cir. 2013).
[21] The caselaw is settled that the Commission's section 206 burden must be met by "principled and reasoned" analysis "supported by the evidentiary record." *See, e.g., TransCanada Power Mktg. Ltd. v. FERC*, 811 F.3d 1, 12 (D.C. Cir. 2015). The Commission may not simply rely on the "end result," but rather is required to set forth a clear methodology for making its determination that ensures rates arrived at will be just and reasonable. *See, e.g., Pac. Gas & Elec. Co. v. F.E.R.C.*, 306 F.3d 1112, 1118 (D.C. Cir. 2002) (citing *City of Charlottesville v. FERC*, 661 F.2d 945, 950 (D.C.Cir.1981)).
[22] 5 U.S.C. §706(2); *see also, National Fuel Gas Supply Corp. v. FERC*, 468 F. 3d 831, 839 (D.C. Cir. 2006) ("*National Fuel*").

record is built may the Commission proceed to adopt a proposed rulemaking establishing new rates.[23]

In support of its far-reaching proposal to reregulate tens of thousands of megawatts of electric capacity, the NOPR claims that the market-driven retirement of coal and conventional nuclear plants requires "urgent action" to "ensure fair compensation" to preserve "generators with on-site fuel supplies."[24] The argument is based on the premise that existing coal and conventional nuclear resources have increasingly been lees competitive in the wholesale markets compared to other resources. Building on that foundation, the NOPR makes the unsupported leap that coal and nuclear resources are essential for maintaining power system reliability and resilience.

The fundamental premises of the NOPR—that resources with a 90-day supply of "on-site fuel" (*i.e.*, coal and nuclear resources) are uniquely able to meet the power system's reliability needs and that the retirement of those resources is threatening the reliability and resilience of the electric grid—are unfounded and, therefore, the NOPR fails to demonstrate that existing RTO/ISO tariffs are unjust and unreasonable. Large quantities of both coal and natural gas capacity have retired in the last twenty years, with most of the retirements associated with older units that are less economic. More recently, less economic, mostly single-unit nuclear plants have begun to retire in some markets. Even as these developments have occurred, there has been no evidence (and the NOPR cites none) that the retirement of this capacity is imminently threatening the reliability and resilience of the electric grid.

To support its claimed threat, the NOPR uses selective quotes from various studies and reports prepared by DOE staff, NERC and IHS Markit that are neither representative of the

[23] *See, e.g., Florida Gas Transmission Co. v. FERC*, 604 F.3d 636, 641 (D.C. Cir. 2010) (stating that the Commission is not authorized to take section 206 action "based on speculation, conjecture, divination, or anything short of factual findings based on substantial evidence").
[24] NOPR at 10.

complete findings or recommendations in those documents nor do they rationally support the NOPR's claims that urgent action is needed and that the loss of coal and conventional nuclear capacity targeted by the proposal will cause an emergency. The NOPR also cites events—such as the Polar Vortex and recent hurricanes—that fail to support the proposal's claimed reliability and resilience emergency. In fact, the very studies and reports the proposal relies upon all conclude that the system does not currently face a reliability or resilience crisis. Those studies and reports, along with verifiable evidence of recent grid performance, all provide substantial evidence showing that electric systems continue to be operated in a manner that is both reliable and resilient even as they adapt to significant retirements of coal and other resources. DOE, NERC, and others have recently explained that electric reliability is strong and increasing. In June, NERC's CEO testified to the Commission that "the state of reliability in North America remains strong, and the trend line shows continuing improvement year over year."[25] A non-public document sent to DOE by NERC in May, which has since been made public, similarly explains that there is no crisis for grid reliability or resilience.[26]

Further, DOE's own August Staff Report to the Secretary on Electricity Markets and Reliability ("Staff Report") states that "[a]ll regions have reserve margins above resource adequacy targets," and that "reliability is adequate today despite the retirement of 11 percent of the generating capacity available in 2002, as significant additions from natural gas, wind, and solar have come online since then."[27] Moreover, the first listed finding in DOE's Staff Report states

[25] FERC, Transcript *FERC Reliability Technical Conference, Panel I: Overview on the State of Reliability* (June 22, 2017).
[26] NERC, *Letter to Secretary Rick Perry*, (May 9, 2017) *available at* https://www.eenews.net/assets/2017/10/03/document_ew_01.pdf.
[27] Department of Energy, *Staff Report to the Secretary on Electricity Markets and Reliability*, 63-64 (August 2017) *available at* https://energy.gov/sites/prod/files/2017/08/f36/Staff%20Report%20on%20Electricity%20Markets%20and%20Reliability_0.pdf.

that "[w]hile markets have evolved since their introduction, they are currently functioning as designed—to ensure reliability and minimize the short-term costs of wholesale electricity—despite pressures from flat demand growth, Federal and state policy interventions, and the massive economic shift in the relative economics of natural gas compared to other fuels."[28]

Below we discuss in more detail the "evidence" cited by the NOPR and how it is wholly insufficient to support a finding that there is a reliability or resilience emergency that renders the existing RTO/ISO tariffs unjust and unreasonable.

1. The NOPR fails to cite any substantial evidence to support its fundamental premise that a 90-day fuel supply is the sole measure of a resilient grid, or that the retirement of generating capacity with 90-days of on-site fuel is harming reliability or resilience today.

The NOPR relies heavily on the unsupported assertion that "the premature retirements of power plants that can withstand major fuel supply disruptions" is causing a reliability and resilience "emergency," and translates that assertion into the arbitrary mandate to defer retirements of generation units with at least a 90-day supply of on-site fuel. But there is no evidence demonstrating that recent retirements of coal and conventional nuclear capacity with 90 days of on-site fuel has impaired reliable system operations.

New England and California operate some of the most reliable power systems in the country, even though they have few power plants that would meet the NOPR's on-site fuel requirement. In fact, analysis presented by the Rhodium Group confirms that, if anything, the regions with the highest levels of coal and nuclear generation see the highest frequency and duration of outages, while regions with the highest levels of renewable generation see the lowest frequency and duration of outages.[29] As explained below, Rhodium also finds that the vast

[28] *Id.* at 10.
[29] Houser, Larsen, and Marsters, *The Real Electricity Reliability Crisis* (Oct.3, 2017) *available at* http://rhg.com/notes/the-real-electricity-reliability-crisis.

majority of customer outages are caused by severe weather and other disruptions to electricity transmission and distribution infrastructure, with a negligible share caused by fuel supply constraints or generation inadequacy, the sole focus of the NOPR.[30]

Having on-site fuel is not a useful metric of power plant reliability or resilience, and there is no evidence that suggests preservation of resources with a 90-day on-site fuel supply is needed to maintain reliability or resilience.[31] In a report this summer, the Brattle Group concluded that "[a]s some of the coal and nuclear power plants face retirement decisions, focusing on their status as baseload generation is not a useful perspective for ensuring the cost-effective and reliable supply of electricity."[32] Indeed, a vast array of independent studies and analyses indicate that reliability and resilience have not been adversely affected by retirements of uneconomic coal and conventional nuclear plants.[33]

First and foremost, numerous data and analyses demonstrate that disruptions to fuel supply account for a trivially small share of electric customer outage hours, and that mandating or otherwise imposing on-site fuel requirements will do little to prevent outages. According to the Rhodium Group's analysis of DOE data, just 0.00007% of customer-hours lost to outage were caused by fuel supply emergencies between 2012-2016, a period when 32% of the country's coal fired power units and 6% of its nuclear generating units retired.[34] This accounted for 2,815

[30] *Id.*
[31] Amory Lovins, Rocky Mountain Institute, *Does "Fuel On Hand" Make Coal and Nuclear Power Plants More Valuable?,* (July 17, 2017), *available at* https://rmi.org/news/fuel-hand-make-coal-nuclear-power-plants-valuable/.
[32] The Brattle Group, *Advancing past "baseload" to a Flexible Grid*, (June 26, 2017)),), *available at* http://www.brattle.com/system/publications/pdfs/000/005/456/original/Advancing_Past_Baseload_to_a_Flexible_Grid.pdf?1498246224.
[33] *See supra* note 30; the Amory Lovins, *Do Coal and Nuclear Generation Deserve Above-Market Prices?*, The Electricity Journal (July 2017); The Analysis Group, *Electricity Markets, Reliability and the Evolving U.S. Power System (*June 2017) *available at* http://www.analysisgroup.com/uploadedfiles/content/insights/publishing/ag_markets_reliability_final_june_2017.pdf.
[34] *See supra* note 25.

customer-hours of disruptions, out of 3.4 billion customer-hours of outages, equivalent to a few hundred people losing power for a few hours. Moreover, 2,333 of those 2,815 customer-hours of outages due to fuel supply interruption were associated with a single failure at a coal plant in northern Minnesota. As Rhodium explains, DOE's proposal "needlessly distracts attention and resources from these other more impactful efforts," like investing in the transmission and distribution infrastructure that accounts for the vast majority of customer outages.[35]

According to a comprehensive study released last year by the National Academies of Sciences, Engineering, and Medicine, the transmission and distribution system is the most vulnerable part of the grid.[36] Other analysis confirms that electric service disruptions in the U.S. are virtually all related to distribution or transmission outages, not unscheduled generation outages.[37] In arguing that resilience is not properly valued, the NOPR even selectively quotes the January 2017 Quadrennial Energy Review to omit the word "wires,"[38] even though transmission and distribution infrastructure was the primary focus of the original document's discussion of resilience, given its finding that "[e]lectricity outages disproportionately stem from disruptions on the distribution system (over 90 percent of electric power interruptions)."[39]

In addition, a 90-day supply of on-site fuel is no guarantee of reliable and resilient operations during severe weather events, like the hurricanes and cold weather events cited in the

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[35] *Id*.
[36] *See* National Academies of Sciences, Engineering, and Medicine, *Enhancing the Resilience of the Nation's Electricity System* (2017), *available at* https://www.nap.edu/catalog/24836/enhancing-the-resilience-of-the-nations-electricity-system?gclid=EAIaIQobChMI9ceY8aj41gIVRAOGCh3xHwmuEAAYASAAEgJeOfD_BwE.
[37] *See* Inside Energy, *Data: Explore 15 Years of Power Outages*, (Aug. 18, 2014) *available at* http://insideenergy.org/2014/08/18/data-explore-15-years-of-power-outages/.
[38] Department of Energy's January 2017 Quadrennial Energy Review, 4-41 (January 2017 QER) *available at* https://www.energy.gov/sites/prod/files/2017/02/f34/Chapter%20IV--Ensuring%20Electricity%20System%20Reliability%2C%20Security%2C%20and%20Resilience.pdf.
[39] *Id.*

NOPR. As explained below, coal plant failures were significant during the Polar Vortex event that the NOPR heavily relies upon.[40] Much like the Polar Vortex, coal plant failures were also a primary cause of the rolling blackouts that occurred in the Electric Reliability Council of Texas ("ERCOT") during a cold snap event in February 2011.[41] During other events, on-site coal piles were rendered useless when they have frozen or become waterlogged, as occurred at some Texas coal power plants during Hurricane Harvey.[42] Coal and conventional nuclear plants have also had their output curtailed due to cooling water constraints during drought events.[43] NERC data show that in many regions conventional power plants of all types frequently experience simultaneous forced outages.[44]

With respect to existing conventional nuclear specifically, during Hurricanes Katrina in 2005, Gustav in 2008, Irene in 2011, and Superstorm Sandy in 2012, a total of 11 nuclear plants were shut down, some of them for weeks at a time.[45] In 2011, a nuclear power plant in Virginia was shut down for more than 10 weeks following a magnitude 5.8 earthquake while the operator

[40] Of the 35,000 MW of generation capacity that failed to respond, nationwide, during the Polar Vortex, 26 percent was coal and 5 percent was nuclear. DOE Staff Report at 98.
[41] ERCOT, *Review of February 2, 2011 Energy Emergency Alert (EEA) Even* (Feb. 14, 2011) *available at* http://www.ercot.com/content/meetings/board/keydocs/2011/0214/Review_of_February_2,_2011_EEA_Event.pdf.
[42] Benjamin Storrow, *Floods Texas coal piles dampen reliability arguments* (Sept. 29, 2017) *available at* https://www.eenews.net/climatewire/2017/09/29/stories/1060062093.
[43] Climate Central, *Heat and Drought Pose Risks for Nuclear Power Plants* (July 18, 2012) *available at http*://www.climatecentral.org/blogs/heat-and-drought-pose-risks-for-nuclear-power-plants.
[44] Murphy, S., J. Apt, J. Moura, and F. Sowell, *Resource adequacy risks to the bulk power system in North America.* In Review at Applied Energy, *available by* request at https://ceic.tepper.cmu.edu/publications/-/media/8f44713e4aed400eb92c209e553525b8.ashx.
[45] Senator Maria Cantwell and other US Senators, *Letter to Secretary Kimberly D. Bose of FERC,* (Oct. 16, 2017) *available at* https://www.energy.senate.gov/public/index.cfm?a=files.serve&File_id=1D3A8F2F-D2CD-4ACA-A694-9B574EAD9E47.

conducted necessary damage assessments, and another nuclear plant in Virginia was shut down due to tornado damage in a separate event earlier that year.[46]

With respect to coal plants, in 2014 alone, there were 11 coal fuel supply emergencies reported by electric generators, including six in the upper Midwest where competing commodity rail shipments restricted the supply of coal to power plants. At last week's Commission meeting, FERC staff's winter energy market assessment warned that "Regions with greater reliance on coal-fired generation must pay attention to coal delivery issues, especially in areas where coal delivery has been an issue in past winters, specifically the Midwest."[47] Drought-driven low water conditions have also disrupted coal barge traffic.

In sum, there is substantial evidence that on-site fuel supply is a poor metric for reliability and resilience, and there is no evidence to support using that metric as the basis for finding that existing RTO/ISO tariffs are unjust and unreasonable, or that they should be reformed to retain uneconomic generating resources. Further, even if on-site fuel were a useful metric, the NOPR provides no evidence or argument for why 90 days is the appropriate standard. This failure to substantiate the proposed 90-day standard further undermines any claim in the NOPR that there is a reliability or resilience emergency that requires action.

2. The studies cited in the NOPR do not support DOE's claims that there is a reliability or resilience emergency that requires urgent action.

The NOPR relies on three recent studies of the electric power system to attempt to show that there is a reliability and resilience emergency requiring urgent federal action to remedy. The NOPR selectively quotes from those documents and ignores readily available information that

[46] Nuclear Regulatory Commission, *North Anna Nuclear Power Plant Seismic Event*, (Aug. 30 and Sept. 1, 2011) *available at* https://www.nrc.gov/docs/ML1124/ML112420551.pdf; NBC 12, *Surry Nuclear Plant Shuts Down After Tornado*, (2011) *available at* http://www.nbc12.com/story/14466559/surry-nuclear-plant-shuts-down-after-tornado.
[47] FERC, *Winter 2017-18 Energy Market Assessment*, (Oct. 19, 2017) *available at* https://www.ferc.gov/market-oversight/reports-analyses/mkt-views/2017/10-19-17-A-3.pdf.

rebuts the conclusions reached by the NOPR. In fact, the studies relied on in the NOPR actually support the conclusion that the grid has accommodated large-scale retirements of older units and even responded positively to the additions of new technology, which has helped to hasten recovery from extreme events and sustain a high level of reliability. The reports the NOPR cites neither support the claim that there is an emergency nor the conclusion that existing rates are unjust and unreasonable and need to be reformed. Instead, they suggest that efforts already underway to enhance grid reliability and resilience are working.

a. The DOE Staff Report concludes that there is no reliability or resilience emergency and recommends technology-neutral, market-based mechanisms to expedite ongoing work on these issues.

The NOPR relies heavily on the DOE Staff Report to argue that "fuel-secure plants" are essential to a resilient grid.[48] But the DOE Staff Report fails to provide a sufficient basis for finding that a reliability and resilience emergency exists; in fact, it reaches the opposite conclusion.

As noted above, the report finds that markets are working as intended to maintain reliability, that "[a]ll regions have reserve margins above resource adequacy targets," and that "reliability is adequate today despite the retirement of 11 percent of the generating capacity available in 2002, as significant additions from natural gas, wind, and solar have come online since then."[49] The DOE Staff Report also explicitly warns against using on-site fuel as a metric for resilience, explaining there are other important steps to increase resilience and even increase fuel assurance.[50]

[48] Department of Energy, *Secretary Perry Urges FERC to Take Swift Action to Address Threats to Grid Resiliency*, 5 (Sept. 29, 2017) *available at* https://energy.gov/articles/secretary-perry-urges-ferc-take-swift-action-address-threats-grid-resilience.
[49] DOE Staff Report at 63-64.
[50] *Id.* at 10-11 ("[M]ost generation technologies have experienced fuel deliverability challenges in the past. While coal facilities typically store enough fuel on-site to last for 30 days or more, extreme cold can lead to frozen fuel stockpiles and disruption in train deliveries. Natural gas is delivered by pipeline as needed.").

The NOPR points to passages in the Staff Report that document how during the Polar Vortex several utilities deployed coal units that were scheduled to retire. Similarly, the report notes that conventional nuclear units, some of which were scheduled to retire, were also deployed during the Polar Vortex. Based on this, the NOPR claims that "sixty-five million people within the PJM footprint could have been affected if these units were not available."[51]

As a threshold matter, the fact that some of these power plants might have provided power during a single weather-related event does not suggest that existing tariffs are unjust and unreasonable if these units are allowed to retire, and it is not surprising that an operational unit provided power during a period of high demand. Nor does it suggest that those retiring units are essential for reliability or resilience today, or that market responses and appropriate RTO/ISO planning measures have not ensured that reliability and resilience can be maintained in their absence. In fact, because resource additions have outpaced retirements, PJM's available generating capacity has increased from an average of 167 GW in January 2014 to 180 GW in January 2017, despite essentially no load growth over that time period, resulting in a nearly 8% net increase in capacity.[52] Because additions have outpaced retirements, the NOPR's argument based on the fact that those units operated during the Polar Vortex is irrelevant. In fact, many additional units could retire and PJM would still have more reserve capacity than it had at the time of the Polar Vortex event.

The actual occurrences during the extreme weather events mentioned by the NOPR demonstrate that existing coal and conventional nuclear generating units have not proven to be the

[51] Department of Energy, *Secretary Perry Urges FERC to Take Swift Action to Address Threats to Grid Resiliency*, 5 (Sept. 29, 2017) *available at* https://energy.gov/articles/secretary-perry-urges-ferc-take-swift-action-address-threats-grid-resilience.

[52] See, *Daily Generation Capacity Reports*, (last visited Oct. 23, 2017) *available at* http://www.pjm.com/markets-and-operations/energy/real-time/historical-bid-data/gen-unavail.aspx (noting the "emergency max" capacity data).

"critical link" for maintaining reliability or resilience during a major hurricane, cold snap, heat wave, drought, earthquake, or other natural or man-made event. The proposal selectively chooses a handful of units to its advantage, while ignoring the mechanical failures and other issues experienced by other coal and nuclear units during the same event. Performance during the Polar Vortex was more a function of freezing equipment than whether or not a unit had on-site fuel.[53] As noted in a recent PJM Report, extreme cold events such as the 2014 Polar Vortex can trigger higher than average unavailability rates for a number of fuel types.[54] Coal and nuclear plants accounted for a large share of power plant failures during the 2014 Polar Vortex event, with PJM alone experiencing 13,700 MW of coal plant outages and 1,400 MW of nuclear plant outages.[55]

The NOPR also fails to mention the crucial performance of demand response, wind and other advanced energy technologies, which kept the lights on during the Polar Vortex event, as demonstrated by PJM and NERC assessments after the event.[56] Similarly, during the ERCOT February 2011 rolling blackout event caused by dozens of conventional generators failing during a cold snap, wind energy output was so strong that the grid operator publicly praised wind generators for their contributions.[57]

b. Contrary to the incomplete discussion in the NOPR, NERC's reliability analyses and recommendations demonstrate that no reliability or resilience emergency exists.

[53] NERC, Polar Vortex Review at 14, 6 (Sept. 2014).
[54] PJM, *PJM's Evolving Resource Mix and System Reliability*, 33 (March 30, 2017) (indicating a risk for natural gas, coal and solar); NERC, Polar Vortex Review at 13, 22 (Sept. 2014) (indicating a 26% outage rate for coal units, much higher than the historical monthly performance rates).
[55] PJM, *Analysis of Operational Events and Market Impacts During the January 2014 Cold Weather Events*, 20 (May 8, 2014) *available at* http://www.pjm.com/~/media/library/reports-notices/weather-related/20140509-analysis-of-operational-events-and-market-impacts-during-the-jan-2014-cold-weather-events.ashx.
[56] *Id.*; NERC, Polar Vortex Review at 14, 6 (Sept. 2014); Michael Goggin, *Wind Power Once Again Saves Millions By Keeping Energy Prices in Check During Cold Snap*, (Jan. 24, 2014) *available at* http://www.aweablog.org/wind-power-once-again-saves-millions-by-keeping-energy-prices-in-check-during-cold-snap/; Greg Hresko and Michael Goggin, *Wind Energy Saves Consumers Money During the Polar Vortex*, (Jan. 2015) *available at* http://awea.files.cms-plus.com/AWEA%20Cold%20Snap%20Report%20Final%20-%20January%202015.pdf.
[57] Kate Galbraith, *Trip Doggett: The TT Interview*, (Feb. 4, 2011) *available at* https://www.texastribune.org/2011/02/04/an-interview-with-the-ceo-of-the-texas-grid/.

The NOPR pulls a single quote from NERC, while failing to acknowledge NERC's consistent findings and statements that changes in the generation mix are being reliably managed today, and with proper planning, will continue to be reliably managed. The NOPR emphasizes a NERC Synopsis of recent assessments stating that "the changing resource mix is altering the operating characteristics of the bulk power system. These changing characteristics must be well understood and properly managed in order to assure continued reliability and ensure resilience."[58] While NERC does reference some of the benefits of fuel diversity and the reliability services provided by coal and nuclear resources in the Synopsis, the report does not describe an emergency that requires urgent federal action or suggest that these trends currently pose reliability concerns, nor does it argue that coal and nuclear are unique in their ability to provide those reliability services. In addition, the Synopsis does not recommend forgoing the complex planning practices or abandoning market mechanisms in the way that the NOPR recommends. Finally, the report does not signal on-site fuel supply as a panacea. Rather, NERC highlights "planning approaches and operating practices" like "scheduling situation awareness" and "information sharing."[59]

The NERC synopsis is worth quoting at length to illustrate the extent of planning, operations, and coordination that currently takes place:

> The North American [Bulk Power System] is designed to be a highly reliable, robust, and resilient system. The system is interconnected, and the integrated networks work together to maintain reliability through both wide-area interregional planning and coordinated system operations. The adequacy of the system is maintained by having the right combination and amount of resources and transmission to deal with unexpected facility outages or extreme weather events

[58] NOPR at 46943 (, *citing* NERC Letter to Secretary of Energy Rick Perry, May 9, 2017, Attachment, "Synopsis of NERC Reliability Assessments" ("Synopsis").
[59] *Id.*

> that increase system demand. Operating reliability is maintained in real time through highly coordinated operator actions across many operating companies. The system is also planned as many as 15 years in advance by performing highly detailed, complex, and data-intensive power system simulations.[60]

The NOPR fails to acknowledge these existing planning practices or NERC's discussion of them, let alone demonstrate that they are insufficient to ensure continued reliability and resilience. Furthermore, the NOPR fails to acknowledge the whole picture provided in NERC's underlying reliability assessments that place NERC's summary findings in context. While NERC notes that "rapid changes occurring in the generation resource mix and new technologies are altering operational characteristics of the grid," NERC recommends that state and federal regulators consider a variety of options to address reliability concerns before they arise.[61] These include technological, infrastructure and economic solutions for all aspects of the grid.[62] Indeed, the Synopsis describes how NERC continues to study the impacts of fuel diversity and generation retirements in order to timely identify emerging issues in this area.[63]

In short, NERC has not found an urgent reliability risk from retirement of generation. Gerry Cauley, the President and Chief Executive Officer of NERC, confirmed this point when he opened testimony before the House Subcommittee on Energy by stating that "[e]ven with all the changes underway, the bulk power system remains highly reliable and resilient, showing improved reliable performance year over year."[64]

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[60] NERC, *Letter to Secretary Rick Perry*, 1 (May 9, 2017) *available at* https://www.eenews.net/assets/2017/10/03/document_ew_01.pdf.
[61] United States Congress, House Energy and Commerce Committee, *Part 1: Powering America: Defining Reliability in a Transforming Electricity Industry* (September 14, 2017), *available at* http://docs.house.gov/meetings/IF/IF03/20170914/106383/HHRG-115-IF03-Wstate-CauleyG-20170914-U1.pdf.
[62] *Id.*
[63] *Id.*
[64] United States Congress, House Energy and Commerce Committee, *Part 1: Powering America: Defining Reliability in a Transforming Electricity Industry* (September 14, 2017), *available at* http://docs.house.gov/meetings/IF/IF03/20170914/106383/HHRG-115-IF03-Wstate-CauleyG-20170914-U1.pdf.

c. The IHS Markit Study does not support a conclusion that there is an imminent reliability or resilience emergency, and warns against the market distorting effects that would be caused by DOE's proposal.

The NOPR also points to a recent IHS Markit study, *Ensuring Resilient and Efficient Electricity Generation: The Value of the Current Diverse US Power Supply Portfolio,* to support its claims regarding resilience.[65] The NOPR cites this study as suggesting that "the increasing cost of ensuring power system resilience is exposing the problem that some current wholesale market price formation rules do not fully compensate generating resources for providing the desired power system supply resilience."[66] However, the study does not claim that 90 days of on-site fuel supply provides "the desired power system supply resilience. Instead, it merely points to benefits of what it calls an "efficient diversity portfolio."[67]

The IHS study also contains a number of serious flaws, as outlined in more detail elsewhere.[68] Most notably, the study: (1) greatly overstates the cost of renewable and natural gas generation, and therefore finds a large cost associated with transitioning to these resources when it should have found a benefit; (2) incorrectly argues renewable policies are the primary factor depressing electricity prices, when DOE's Staff Report and others have documented that cheap gas and flat electricity demand are by far the largest factors;

[65] NOPR at 46,943.
[66] Department of Energy, *Secretary Perry Urges FERC to Take Swift Action to Address Threats to Grid Resiliency*, 5 (Sept. 29, 2017) *available at* https://energy.gov/articles/secretary-perry-urges-ferc-take-swift-action-address-threats-grid-resilience.
[67] IHS Markit, *Ensuring Resilient and Efficient Electricity Generation: The Value of the Current Diverse U.S. Power Supply Portfolio,* (Sept. 19, 2017).
[68] Michael Goggin, *Report by competing energy sources ignores renewable energy technology advances* (Oct. 2017) *available at* www.aweablog.org/report-ignores-renewable-technology-advances.

and (3) ignores technological advances that allow wind and solar to now provide reliability services.

In addition, the IHS study cited by the NOPR does correctly explain that one should expect "the orderly economic replacement of unprofitable, obsolete generating technologies with new, profitable state-of-the-art natural gas–fired generating technologies."[69] However, DOE's proposed subsidies for coal and nuclear plants would prevent the beneficial market-based outcome that IHS suggests should be expected, and instead would lead to the very market distortions and consumer harms that the IHS report warns against—a direct subsidy for energy production from coal and nuclear generators.

3. Analysis and reports from grid operators and other entities, not cited in the NOPR, demonstrate that there is no reliability or resilience emergency, contrary to the NOPR's characterization.

a. Grid Operators Report no Emergency with Respect to Reliability and Resiliency

Those responsible for maintaining grid reliability directly contradict the NOPR's claim that reliability and resilience are at risk. In July 2017, all the wholesale market operators testified before Congress that their markets are functioning well and reliability is being maintained.[70] Most recently, at last week's Commission meeting, FERC staff's winter energy market assessment reported that "[a]ll regions are expected to maintain healthy reserve margins for the winter,"[71] a finding confirmed by NERC's Winter Reliability Assessment.[72] The regional reports

[69] IHS Markit, Ensuring Resilient and Efficient Electricity Generation: The Value of the Current Diverse U.S. Power Supply Portfolio, (Sept. 19, 2017).
[70] United States Congress, House Energy and Commerce Committee, *Powering America: A Review of the Operation and Effectiveness of the Nation's Wholesale Electricity Markets* (July 26, 2017).
[71] FERC, *Winter 2017-18 Energy Market Assessment* (Oct. 19, 2017) *available at* https://www.ferc.gov/market-oversight/reports-analyses/mkt-views/2017/10-19-17-A-3.pdf.
[72] NERC, *2016-2017 Winter Reliability Assessment*, (last visited Oct. 23, 2017) *available at* http://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/WRA%202016_2017_final.pdf.

accompanying those FERC[73] and NERC winter assessments unanimously confirm that to be the case, with the regional market operators discussing the various completed and ongoing initiatives to bolster winter reliability and resilience. A wide range of other commenters have presented evidence confirming that grid reliability and resilience are strong and that there is no emergency.[74]

PJM, the RTO that has the most generators expected to receive payments if the proposal were adopted,[75] reported that its markets are functioning well and reliability is improving.[76] At the hearing mentioned above, a Senior PJM executive testified that "investors are investing, consumers are enjoying the lowest electricity prices, and our system is more diverse and reliable than it has ever been."[77] PJM has also conducted forward-looking analysis demonstrating that reliability and resilience can be maintained under a range of future generation mixes, including many with a very high penetration of renewable resources.[78] Potomac Analytics, the Independent Market Monitor for PJM, wrote that "current fuel diversity is higher than ever in PJM."[79]

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[73] FERC, *Calendar of Events, Commission Meetings October 19, 2017,* (Last visited Oct. 23, 2017) *available at* https://www.ferc.gov/EventCalendar/EventDetails.aspx?ID=8475&CalType=%20&CalendarID=101&Date=10/19/2017&View=Listview.

[74] *See, e.g., Comments of the Bipartisan Former FERC Commissioners in Docket RM18-1-000,* (Oct. 19, 2017) *available at* https://elibrary.ferc.gov/idmws/common/downloadOpen.asp?downloadfile=20171019%2D5053%2832468701%29%2Epdf&folder=10493449&fileid=14715039&trial=1; *Initial Comments of the R Street Institute,* (Oct. 18, 2017) *available at* http://www.rstreet.org/wp-content/uploads/2017/10/Initial-On-Site-Fuel-NOPR-comments-1.pdf.

[75] Christian Roselund, *Energy Department Limits Scope of Coal, Nuclear Bailout,* (Oct. 12, 2017).

[76] *See* PJM, *PJM's Evolving Resource Mix and System Reliability*, 4 (March 30, 2017).)

[77] Congress of the United States, Transcript of *Power America: A Review of the Operation and Effectiveness of the Nation's Wholesale Electricity Markets,* 53 (July 26, 2017) *available at* http://docs.house.gov/meetings/IF/IF03/20170726/106323/HHRG-115-IF03-Transcript-20170726.pdf.

[78] PJM, *PJM's Evolving Resource Mix and System Reliability,* 5 (March 30, 2017).

[79] Monitoring Analytics, *State of the Market Report,* 3 (March 9, 2017) *available at* http://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2016/2016-som-pjm-volume2.pdf.

The IMM's report also points out several paths towards addressing fuel security concerns that do not involve out-of-market interventions to prevent coal and nuclear retirements:

> If fuel security for gas is a concern, a number of issues should be considered including the reliability of the pipelines, the compatibility of the gas pipeline regulated business model with long term guaranteed contracts and the merchant generator market business model, the degree to which electric generators have truly firm gas service and the need for a gas RTO to help ensure reliability.[80]

In addition, Nick Brown, President and CEO of SPP, described how the grid is reliably adapting to the changing resource mix:

> As an engineer with training in operations and planning, if you had asked me 10 years ago if we would have been able to reliably accommodate even half of the [nearly 17,000 megawatts of wind in SPP's footprint] I would have said no. Period. End of discussion. So how are we able to that today? There are specific reasons that we are able to accommodate that magnitude of wind in a very reliable fashion.[81]

Mr. Brown then went on to describe transmission investments, a day-ahead energy and unit commitment market, and consolidation of 20 balancing authorities in the RTO's 14-state footprint. Mr. Brown did not suggest that a reliability or resilience emergency is at hand, or that there is a need for out-of-market interventions to prevent baseload retirements.

In MISO, the changing resource mix includes a rapid expansion of renewables and natural gas and the retirement of 13,000 MW of coal generation. Executive Vice President of Operations, Richard Doying said of these developments: "How do markets adapt to those changes? We innovate. We create new market products and new market services in order to accommodate those changes in the resource mix."[82] Similarly, ERCOT Senior Vice President and Chief Operating

[80] *Id*.
[81] *Id.* at 24.
[82] Congress of the United States, Transcript of *Power America: A Review of the Operation and Effectiveness of the Nation's Wholesale Electricity Markets*, 36 (July 26, 2017) *available at* http://docs.house.gov/meetings/IF/IF03/20170726/106323/HHRG-115-IF03-Transcript-20170726.pdf.

Officer, Cheryl Mele, has testified that "ERCOT has processes in place to address concerns that may arise when a unit's retirement impacts transmission system reliability. Rather than rely only on those types of out-of-market processes, ERCOT works with the Texas PUC and stakeholders to align market design with the realities of managing a changing grid." [83]

The NOPR fails to acknowledge or reconcile these reports (or, as discussed below, the tools and practices grid operators use to manage the changing resource mix). The NOPR's claim that a reliability and resilience emergency is imminent that requires immediate government intervention in the competitive marketplace simply cannot be squared with these analyses and statements from NERC and the nation's grid operators, who have the responsibility for ensuring reliable operations. As a result, the NOPR cannot provide a basis for finding that the existing RTO/ISO tariffs are unjust and unreasonable and require immediate reform.

b. Numerous independent analyses have found that there is no reliability or resilience emergency, and that the grid is benefiting from increased diversity and deployment of advanced technologies.

Many other analyses show that the grid is benefiting from technological innovation and a changing resource mix. For instance, earlier this year, the Advanced Energy Economy Institute published *Changing the Power Grid for the Better*, describing how the increased deployment of advanced energy is reducing costs and enhancing reliability.[84] Similarly, the Analysis Group published *Electricity Markets, Reliability, and the Evolving U.S. Power System*, finding that retirement of ageing power plants is a natural result of well-functioning power markets and that replacing these with newer, more technologically

[83] *Id.* at 6.
[84] Advanced Energy Economy, *Changing the Power Grid for the Better*, (May 2017) *available at https*://info.aee.net/changing-the-power-grid-for-the-better.

advanced power system improves the operations of the grid.[85] Further, in *Advancing Past "Baseload" to a Flexible Grid*, the Brattle Group argues that what grid operators need are resources with more flexibility, not more inflexible resources like ageing coal and conventional nuclear resources, and that markets should compensate this flexibility.[86] These reports all demonstrate that a reliability or resilience emergency is not being created by the market-driven retirement of coal and nuclear resources.

4. The NOPR fails to recognize the myriad existing tools and processes already in place to address potential reliability and resilience problems caused by generator retirements, and fails to demonstrate that any of these tools have become unjust and unreasonable.

The NOPR fails to acknowledge all of the existing tools and processes that are already in place to manage the reliability and resilience effects of plant retirements, or provide any explanation of why they are insufficient, further undercutting the claim that any emergency exists. Moreover, the NOPR provides no basis for concluding that all of these existing tools and processes (discussed below) are unjust and unreasonable, which would be required in order to override them with the broad-ranging proposal in the NOPR.

a. Within most regions, states and other local authorities regulate the resource procurement decisions of load serving entities to ensure reliability.

Reliability and resilience are inherently local concepts. Seasonal weather patterns, risk of extreme events like wildfires, earthquakes, and hurricanes, resource availability, transmission constraints, and consumption patterns vary significantly across local jurisdictions. Regional, state

[85] Analysis Group, *Analysis Group Report Finds that the Transition Underway in the U.S. Power System Is Not Harming Reliability,* (June 20, 2017) *available at* http://www.analysisgroup.com/news-and-events/news/analysis-group-report-finds-that-the-transition-underway-in-the-us-power-system-is-not-harming-reliability/.
[86] The Brattle Group, *Advancing past "baseload" to a Flexible Grid*, (June 26, 2017) *available at* http://www.brattle.com/system/publications/pdfs/000/005/456/original/Advancing_Past_Baseload_to_a_Flexible_Grid.pdf?1498246224.

and local authorities are in the best position to address the specific reliability and resilience needs of the local electric power system. The NOPR fails to acknowledge these state and local prerogatives on resource planning and acquisition to manage the reliability effects of plant retirements.

State and local authorities already regulate the resource procurement decisions of load serving entities within the RTO/ISO regions in different ways. Some states continue to engage in integrated resource planning, while other states rely on RTO/ISO markets to determine which generation resources will be used to serve load. In either case, each state has made a deliberate decision to rely on a particular regulatory or market structure for resource procurement consistent with the rights reserved to them under section 201(a) of the FPA.[87] The NOPR seeks to preempt these choices by imposing a federal mandate for the procurement of a preferred set of resources, without ever demonstrating why the generation already procured through the regulatory and market structures chosen by each state is not sufficient to address any perceived problems.[88]

b. Competitive markets have and continue to stimulate responses to fuel assurance and other reliability issues, and the Commission and the RTOs/ISOs are already considering sensible reforms to ensure that markets will continue to support reliability and resilience.

Competitive wholesale electricity markets have inherent features that help ensure electric reliability by rewarding performance. As in any market, wholesale electricity prices increase when

[87] 16 U.S.C. § 824(b).

[88] In this regard, DOE's proposal to use its section 403 authority to direct the Commission to address a claimed "emergency" by broadly preserving a set of generation resources that would otherwise retire appears to contravene the intent of Congress that such federal interventions be limited. Congress provided specific authority for DOE to take emergency action in the face of reliability threats under Section 202(c) of the FPA. 16 U.S.C. §824a(c). Under that provision, DOE is authorized to take action to temporarily order the continued operation of a generating plant or other facility if it is determined "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." Id. This provision demonstrates that Congress only intended for federal intervention by DOE to require the continued operation of electric facilities to be targeted to specific plants and circumstances, and for a limited period.

demand is high and supply is short, rewarding resources that provide power when it is needed most. Some grid operators also have capacity markets that pay power plants for providing capacity to meet peak demand. Other reliability services, such as frequency regulation, are also procured through separate ancillary services markets. Procuring all of these services through competitive markets ensures reliability while also providing efficiency benefits for consumers and spurring innovation in new advanced energy technologies that can provide reliability services more readily than conventional generation.[89]

These competitive market signals have already demonstrated that they can spur reliability and resilience improvements. For example, although the winter following the Polar Vortex reached similar frigid temperatures, none of the previously impacted markets experienced power supply concerns or the same severe increase in gas supply costs, due to the market response and other changes following the 2014 Polar Vortex.[90] Among other things, competing generators in the market made plans to firm their fuel supply and invest in dual-fuel capability to ensure that they would be available during such conditions (when supply and demand drove power prices higher) in the future, while others invested in better weatherization of their equipment.[91]

Moreover, both the Commission and the RTOs/ISOs are undertaking market design reforms to address the reliability and resilience concerns underlying the NOPR. The Commission itself has recently issued a number of Orders on these topics, as outlined in Congressional

[89] NERA Economic Consulting, *Competitive Electricity Markets: The Benefits for Customers and the Environment,* (Feb. 2008) *available at* http://www.nera.com/content/dam/nera/publications/archive1/PUB_CompetitiveElectricityMarkets_Feb2008.pdf.
[90] *See e.g.,* ISO New England, *Winter 2015/2016: Sufficient Power Supplies Expected to be Available,* (last visited Oct. 23, 2017).
[91] *See e.g.,* New York ISO, *Power Trends 2016, The Changing Energy Landscape,* (2016) *available at* http://www.nyiso.com/public/webdocs/media_room/publications_presentations/Power_Trends/Power_Trends/2016-power-trends-FINAL-070516.pdf.

testimony by Chairman Chatterjee last month[92] and in the list of Commission actions provided on pages 8-10 of the NOPR itself. Moreover, as discussed in more detail below, the Commission can address any additional concerns associated with the concept of resilience through a number of pending rulemakings and open dockets, and can institute additional inquiries. The NOPR fails to explain why these actions are insufficient to ensure reliability and resilience, aside from a brief and conclusory three sentence reference to the unsupported and incorrect premise that resources with on-site fuel are essential for resilience.[93]

Notably, many of these efforts were undertaken in direct response to the Polar Vortex, which DOE cites here as evidence of the reliability and resilience problem that must be addressed. In particular, PJM and ISO-NE have implemented capacity market reforms that impose strict performance requirements on resources participating in the capacity market to give them stronger market signals to invest in needed fuel supply arrangements to be able to provide electricity when called upon.[94] The NOPR does not provide any explanation as to why these programs (which have yet to come into full implementation in some cases) are inadequate to address reliability and resilience concerns stemming from generator retirements.

Finally, the RTO/ISO organized markets incorporate multiple reliability requirements to ensure the power system is reliable and resilient. For example, the Commission,[95] NERC[96] and

[92] United States Congress, House Energy and Commerce Committee, *Part 1: Powering America: Defining Reliability in a Transforming Electricity Industry* (September 14, 2017), *available at* http://docs.house.gov/meetings/IF/IF03/20170914/106383/HHRG-115-IF03-Wstate-CauleyG-20170914-U1.pdf.
[93] NOPR at 10 (““Nevertheless, the fundamental challenge of maintaining a resilient electric grid has not been sufficiently addressed by the Commission or the ISOs and RTOs. The continued loss of fuel-secure generation must be stopped. These generation resources are necessary to maintain the resilience of the electric grid.”)
[94] *See PJM Interconnection, L.L.C.*, 151 FERC ¶ 61,208 (2015), *order on reh'g*, 155 FERC ¶ 61,157 (2016); *ISO New England Inc.*, 147 FERC ¶ 61,172 (2014), *reh'g denied*, 153 FERC ¶ 61,223 (2015).
[95] *Interconnection for Wind Energy*, FERC Order No. 661-A (Dec. 12, 2005).
[96] NERC, PRC-024-1, *Generator Frequency and Voltage Protection Relay Settings*, (last accessed Oct. 18, 2017).

RTOs/ISOs[97] have implemented ride-through requirements in their tariffs to ensure that power plants remain online through disturbances to power system frequency and voltage.[98] The ability of generators to remain online and not cause a cascading outage in the event of frequency disturbances caused by the loss of large generators or voltage disturbances caused by the loss of large transmission lines, whether triggered by severe weather, accident or intentional attack, is one of the most essential elements of resilience. Frequency and voltage disturbances occur fairly often, and the failure of large conventional power plants, particularly coal and nuclear plants, to ride-through these events has been a contributing factor in some blackouts and electric reliability events.[99] The NOPR offers no evidence that resilience is not adequately protected by these existing and under development federal, state and regional regulations, reliability requirements and market structures.

c. All RTOs/ISOs have Reliability Must Run provisions in their tariffs to address any potential reliability issues associated with planned generator retirements.

If the potential retirement of a generating unit threatens grid reliability, every RTO/ISO has the authority to enter into Reliability Must Run ("RMR") agreements (or similar agreements) that provide cost recovery for generators needed for reliable operations.[100] The case-specific evaluation of retiring units ensures that only those generating units actually needed for reliability are provided out-of-market cost support payments from the RTO/ISO. Under these provisions, each RTO/ISO completes case-specific evaluation of units declaring an intent to retire to ensure

[97] ERCOT, *High Voltage- Ride Through (HVRT) for Intermittent Renewable Resources (IRR)*, (Nov. 5, 2015).
[98] Notably, the Commission requirement for and capability of wind plants to ride-through such events is much greater than that for conventional generators.
[99] Michael Goggin, *Power System Experts Agree: Wind Energy Can Help Reliably Meet EPA's Clean Power Plan* (June 11, 2015) *available at* http://www.aweablog.org/power-system-experts-agree-wind-energy-can-help-reliably-meet-epas-clean-power-plan/.
[100] *See, e.g., New York Independent System Operator, Inc.*, 150 FERC ¶ 61,116 (2015) (describing the RMR processes of various RTOs/ISOs, and directing NYISO to adopt RMR provisions).

that only those generating units actually required for reliability are provided out-of-market cost support payments from the RTO/ISO. It also requires the resource owner to formally indicate its intent to retire, which separates resources that need additional payments from those that simply want additional payments. Finally, these provisions generally provide cost-based revenues to needed units for a limited time, until market responses can be implemented to resolve the reliability concern that required they be retained through out-of-market support.[101] In this way, RMR agreements balance the need for unit-specific cost-based rate support with the Commission's consistent reliance on competitive markets to ensure just and reasonable rates and avoid undue discrimination.[102] The NOPR does not account for these provisions, or explain why they are no longer just and reasonable and do not ensure that services needed for reliability and resilience are provided.

B. The NOPR broadly provides cost-based out-of-market compensation to a select set of generation resources is not just and reasonable and is unduly discriminatory against other technologies that can provide the same reliability and resilience benefits.

As discussed above, the NOPR fails to demonstrate that the economic retirement of generators with 90-day on-site fuel supplies threatens the resilience of the electric grid and thus renders RTO/ISO tariffs unjust and unreasonable. Accordingly, the Commission's inquiry under section 206 of the FPA should be at an end; if it is not first determined that the existing tariffs are unjust and unreasonable, the Commission has no authority to proceed to establish a new just and reasonable rate.[103]

[101] *Id* at 2; Energy Vortex, *Energy Dictionary*, (last visited Oct. 23, 2017) *available at* https://energyvortex.com/energydictionary/reliability_must_run_generation.html.
[102] *Id*.
[103] *Emera Maine v. FERC*, 854 F.3d 662 (2017).

Even if the NOPR did provide a basis for the Commission to find that existing RTO/ISO tariffs are unjust and unreasonable, however, DOE's proposed solution has not been shown to be just and reasonable and not unduly discriminatory or preferential. To the contrary, DOE's proposal is unduly discriminatory and preferential because it would shield a small set of electric generators—*i.e.*, coal and conventional nuclear units with 90 days of on-site fuel supply—from market competition through full cost-of-service compensation, without any demonstration that these generators provide a unique reliability or resilience benefit that cannot also be provided by others resources. Moreover, the proposal is unjust and unreasonable because it would impose massive costs on consumers and distort the market price signals that the RTO/ISO markets rely on to ensure just and reasonable rates, without any demonstration that it will produce benefits commensurate with those costs. Without any articulable definition of "resilience" or set of metrics to assess how resilience is provided, the costs that the NOPR would impose simply cannot be justified. Accordingly, the Commission should soundly reject the proposal to carve out this set of preferred resources for special out-of-market treatment.

1. The proposal is unduly discriminatory and preferential because it provides a reliability and resilience payment to a subset of preferred generators, even though many other technologies can provide the same—and often superior—reliability and resilience values.

The NOPR sets out a goal of ensuring the resilience of the grid in RTO/ISO regions, but limits the universe of technologies that can receive compensation for providing resilience value to those regions to a narrow class of technologies—those with a 90-day supply of on-site fuel, which, as noted elsewhere, amounts to limiting it primarily to coal and conventional nuclear resources. The NOPR fails to explain why this single attribute—long-term fuel supply at an electric generating plant—provides a resilience benefit that other operational or technical attributes do not. Further, it ignores the range of operational characteristics and attributes that contribute to a reliable

and resilient electricity system, in an apparent effort to direct compensation for resilience to a set of preferred resources. Accordingly, the NOPR would violate the FPA's requirement that rates be free of undue discrimination or preference.[104]

The NOPR completely ignores that resilience can be dramatically improved by making the grid more flexible and intelligent, and the fuel supply more diverse. There are a wide-range of advanced energy technologies available in the market today that can improve reliability and resilience more cost-effectively than coal and conventional nuclear resources. The proposal is unduly discriminatory and preferential for failing to allow these resources to compete to provide reliability and resilience services, and fails to acquire these services in the most cost-effective way, making it unjust and unreasonable.

A well-balanced mix of flexible and renewable resources, including natural gas, biomass, solar, wind, geothermal, hydropower and distributed resources like fuel cells, can provide electricity that is low-cost, reliable, and resilient, as discussed below. Advanced grid technologies are helping to integrate variable generation, increasing the output from these resources and amplifying their contribution to resource adequacy, and providing the grid with other operational benefits that improve reliability and resilience. These technologies include utility-scale variable power plant control systems (which are becoming more prominent in utility-scale solar and wind plants), energy storage, advanced metering infrastructure, demand response, advanced modular nuclear plants, distribution automation, microgrids, high voltage direct current transmission, and smart grid management technologies.[105] Meanwhile, demand-side management technologies,

[104] 16 U.S.C. §§ 824d-e.

[105] For example, Solana Generating Station, a 288 MW concentrating solar facility in Arizona, uses on-site thermal storage to supply power 24 hours a day. Arizona Public Service, "News Release: Solana Begins Serving Customers; Providing Solar Power at Night." (9 Oct. 2013) available online at http://www.azenergyfuture.com/blog/october-2013/news-release-solana-begins-serving-customers-pro/; *see also, e.g.*, J. Doyle, B. Haley, C. Fachiol, B. Galyean, D. T. Ingersoll, "Highly Reliable Nuclear Power for Mission-Critical Applications," Proceedings of ICAPP 2016,

such as energy efficiency and demand response, reduce peak demand, thus lowering necessary reserve capacity and improving resource adequacy. Lawrence Berkley National Laboratory ("LBNL") cites load shifting, energy efficiency, and renewable energy as viable strategies to improve overall grid reliability and resilience.[106] Smart grid technologies can improve system restoration by providing grid operators with improved situational awareness and more accurate outage location information, and can even help avoid outages by enabling more optimal use of the transmission system.[107] In *Storm Reconstruction: Rebuild Smart, Reduce Outages, Save Lives, Protect Property*, the National Electric Manufacturers Association ("NEMA") detailed the benefits of smart meters, grid automation, energy storage, and combined heat and power ("CHP") in reducing power outage and restoration time.[108] These technologies, used in conjunction with on-site generators, can also be used to create microgrids with self-fixing and islanding capabilities that can be used during an emergency. [109]

The range of technologies that are able to provide reliability and resilience benefits have proven their effectiveness in recent extreme weather events—which the NOPR cites as support for its proposal to favor only coal and conventional nuclear resources. Earlier this year, Hurricane

San Francisco, CA, April 17-20, 2016, available online at http://www.nuscalepower.com/images/our_technology/Power-Reliability_ICAPP16_final.pdf./.

[106] Lawrence Berkley National Laboratory (LBNL). "Reliability of the U.S. Electricity System: Recent Trends and Current Issues." (Aug. 2001) *available* online at http://emp.lbl.gov/sites/all/files/REPORT%20lbnl%20-%2047043.pdf.

[107] Edison Electric Institute, *Before and After the Storm: A Compilation of Recent Studies, Programs, and Policies Related to Storm Hardening and Resiliency*, (March 2014) *available at* http://www.eei.org/issuesandpolicy/electricreliability/mutualassistance/Documents/BeforeandAftertheStorm.pdf.

[108] National Electrical Manufacturers Association, *Storm Reconstruction: Rebuild Smart Reduce Outages, Save Lives, Protect Property*, (2013) *available at* https://www.nema.org/Storm-Disaster-Recovery/Documents/Storm-Reconstruction-Rebuild-Smart-Book.pdf.

[109] Military installations are increasingly using microgrids to power bases during extended outages while also improving resilience to cybersecurity threats. *See* Department of Energy, *SPIDERS JCTD Smart Cyper-Security Mictrogrids*, (last visited Oct. 23, 2017) *available at* https://energy.gov/eere/femp/spiders-jctd-smart-cyber-secure-microgrids.

Irma caused 6.7 million customers to lose power in Florida. Customers, businesses, and cities with solar plus storage and smart inverters that allow the system to operate even when the utility's grid is down, were able to restore power and use refrigerators and microwaves, charge their phones and access Wi-Fi.[110] Tampa Electric Co. dispatched all 40MW of its demand response resources to balance supply and demand while it restored parts of the transmission and distribution network to service.[111] In Texas, Hurricane Harvey caused substantial power outages affecting over a quarter million people. According to EIA, these outages were primarily due to flooding of fuel supplies, travel disruptions from personnel, and damage to transmission infrastructure.[112] Lack of reliable backup generation to power critical refrigeration equipment caused hazardous chemicals to break down and explode at the Arkema manufacturing plant.[113] Backup diesel generators failed due to flooding. In contrast, most wind plants near the affected area continued to operate, and those that were taken offline were able to come back online once the power grid was restored.[114] According to one wind project owner, "the delay in restarting was mostly because the power lines were damaged."[115]

[110] Trimmel Gomes, *After Irma, Solar Power Helped Keep Florida Shining*, (Sept. 19, 2017) *available at* http://www.publicnewsservice.org/2017-09-19/energy-policy/after-irma-solar-power-helped-keep-florida-shining/a59469-1.
[111] Sarah McAuley, *Follwing Hurricane Irma, Demand Response Stepped Up Amid Efforts to Restore Power*, (Sept. 26, 2017) *available at* https://energysmart.enernoc.com/following-hurricane-irma-demand-response-stepped-amid-efforts-restore-power.
[112] U.S. Energy Information Administration, *Hurricane Harvey Caused Electric System Outages and Affected Wind Generation in Texas*, (Sept. 13, 2017) *available at* https://www.eia.gov/todayinenergy/detail.php?id=32892.
[113] Andrew Burton, *Explosions and Black Smoke Reported at Chemical Plant*, (Aug. 30, 2017) *available at* https://www.nytimes.com/2017/08/30/us/hurricane-harvey-flooding-houston.html?_r=0.
[114] U.S. Energy Information Administration, *Hurricane Harvey Caused Electric System Outages and Affected Wind Generation in Texas*, (Sept. 13, 2017) *available at* https://www.eia.gov/todayinenergy/detail.php?id=32892; Brian Eckhouse, *Harvey Pushed This Texas Wind Farm All the Way to the Max*, (Aug. 31, 2017) *available at* https://www.bloomberg.com/news/articles/2017-08-31/harvey-pushed-this-texas-wind-farm-all-the-way-to-the-max.
[115] Russell Gold, *In Big Test of Wind Farm Durability, Texas Facility Quickly Restarts After Harvey*, (Sept. 1, 2017) *available at* https://www.wsj.com/articles/texas-wind-farm-back-online-1504294083.

Puerto Rico's power outages caused by Maria and Irma were absolute—the entire island lost power. This makes restarting conventional generation resources impossible without black start capability—that is, the ability to restart without access to an external power source—from smaller generators (coal and nuclear generators do not typically provide black start capability).[116] A number of advanced energy companies are rapidly deploying microgrid technology in Puerto Rico in response to the storm. Tesla is sending battery systems along with Sonnen GmbH, another battery manufacturer and Sunnova is installing rooftop solar.[117] Navigant expects that the rapidly declining costs of batteries and demand for more resilient power supplies will encourage $22.3 billion in battery investment like the kind underway in Puerto Rico right now over the next 10 years.[118] Moreover, properly configured photovoltaic power systems with storage can also add to resilience capabilities in situations like those currently facing Puerto Rico. All of these technologies are enhancing the resilience of the grid and working to restore power supply right now, and will continue to be expanded.

Advanced energy can provide many ancillary services that conventional power plants are either unable to provide or provide poorly. Battery storage and inverter-based generation technologies excel at providing power quality services like frequency regulation, reactive power and automatic generation control.[119] Renewables equipped with smart inverters, which are

[116] Aylin Woodward, *Why Puerto Rico Still Has No Electrical Power and How to Fix It*, (Sept. 29, 2017) *available at* https://www.newscientist.com/article/2149019-why-puerto-rico-still-has-no-electrical-power-and-how-to-fix-it/.
[117] Chris Martin, *Storms Spur $22 Billion Investment in Battery-Backed Grids*, (Oct. 3, 2017) *available at* https://www.bloomberg.com/news/articles/2017-10-03/storms-unleash-22-billion-in-spending-for-battery-backed-grids.
[118] Navigant Research, *Installed Energy Storage for Microgrids Revenue Expected to Total More than $22 Billion in the Next Decade*, (last visited Oct. 23, 2017) *available at* https://www.navigantresearch.com/newsroom/installed-energy-storage-for-microgrids-revenue-expected-to-total-more-than-22-billion-in-the-next-decade.
[119] *See* Vahan Gevorgian and Barbara O'Neill, *Advanced Grid-Friendly Controls Demonstration Project for Utility-Scale PV Power Plants*, (Jan. 2016) *available at* https://www.nrel.gov/docs/fy16osti/65368.pdf; Chen, et al. *Development of Performance-Based Two-Part Regulating Reserve Compensation on MISO Energy and Ancillary Service Market* (July 2015) *available at*

increasingly becoming standard-issue in the United States, can also provide power quality services like frequency regulation.

In contrast, conventional nuclear and coal generation struggle to provide many of these same ancillary services that are vital to reliability and resilience. For example, conventional nuclear plants and many coal plants do not provide the "operating reserves" or "frequency services" that the NOPR proposes to require for a plant to receive out-of-market compensation. Most coal and conventional nuclear plants have little to no flexibility or dispatchability to provide frequency services or operating reserves. Data from the MISO grid operator demonstrates that many coal plants fail to provide accurate frequency regulation, with many coal plants worsening frequency deviations by responding in the opposite direction.[120]

Conventional nuclear plants do not typically provide operating reserves, and were specifically exempted from a 2016 Commission proposal that requires all other generators to have the capability to provide primary frequency response.[121] NERC has documented that 90 percent of conventional power plants fail to provide sustained primary frequency response, and that conventional power plants are responsible for an observed decline in primary frequency response.[122]

https://www.researchgate.net/publication/273396490_Development_of_Performance-Based_Two-Part_Regulating_Reserve_Compensation_on_MISO_Energy_and_Ancillary_Service_Market.

[120] Chen, et al. *Development of Performance-Based Two-Part Regulating Reserve Compensation on MISO Energy and Ancillary Service Market* (July 2015) *available at* https://www.researchgate.net/publication/273396490_Development_of_Performance-Based_Two-Part_Regulating_Reserve_Compensation_on_MISO_Energy_and_Ancillary_Service_Market.

[121] *Essential Reliability Services and the Evolving Bulk-Power System—Primary Frequency Response*, 151 FERC ¶ 61,122 (2016).

[122] NERC, *Frequency Response Initiative Report*, (Oct. 30, 2012) *available at* http://www.nerc.com/docs/pc/FRI_Report_10-30-12_Master_w-appendices.pdf.

The NOPR's mandate would harm consumers and electric reliability and result in undue discrimination by only paying coal and nuclear generators for providing frequency services and operating reserves, even though in most cases they are not able to cost-effectively do so. PJM and other analysts have compiled tables showing the reliability services contributions of different energy sources, and the unanimous finding is that no single resource excels at providing all reliability services at all times. For example, in PJM's analysis of 13 reliability services and attributes, coal fully provides only seven and nuclear only four.[123] If anything, PJM's historical analysis understates the increasing reliability services contributions of renewable resources going forward, and also overstates the services actually provided by many conventional generators today.[124] Regardless, these analyses unanimously demonstrate that because no single resource excels at providing all reliability services at all times, markets are extremely useful for efficiently determining which resource can most cost-effectively provide a needed service at any point in time through an elegant division of labor.

The American Wind Energy Association reviewed dozens of reports by NERC, FERC, grid operators, and other experts to assemble its own table showing different resources' contributions to reliability needs.[125] The sources cited in that table confirm that wind and solar resources now provide grid reliability services, in many cases better than conventional power plants.

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[123] PJM, *PJM's Evolving Resource Mix and System Reliability,* March 2017, *available at* http://www.pjm.com/~/media/library/reports-notices/special-reports/20170330-pjms-evolving-resource-mix-and-system-reliability.ashx.

[124] Michael Goggin, *PJM study quantifies wind's value for building a reliable, resilient power system,* (April 4, 2017) *available at http*://www.aweablog.org/pjm-study-quantifies-winds-value-building-reliable-resilient-power-system/.

[125] Michael Goggin, *Renewable on the grid: Market-based solutions support reliability* (July 19, 2017) *available* at http://www.aweablog.org/renewables-grid-market-based-solutions-support-reliability/. A larger table with linked citations is *available at* http://awea.files.cms-plus.com/FileDownloads/pdfs/Services%20Graphic.pdf.

For example, NERC has documented that wind energy "offers ride-through capabilities and other essential reliability services,"[126] and NERC's CEO testified at a House hearing last month that "[v]ariable resources significantly diversify the generation portfolio and can contribute to reliability and resilience in important ways."[127] During subsequent questioning at that event, Mr. Cauley explained that due to technological advances, renewable resources are now able to provide the reliability services traditionally provided by conventional resources. Wind and solar photovoltaics are also not subject to either fuel delivery constraints or cooling water constraints because they require neither. As grid operators like PJM have found, adding wind can increase power system resilience.[128] Earlier this year, in California, CAISO, First Solar, and the National Renewable Energy Laboratory ("NREL") conducted a series of tests on a 300 MW solar PV facility to see if it could provide ancillary services as well as natural gas peaker plant.[129] The tests determined that, in every category of ancillary service, the solar plant performed as well or better than the conventional resource.

NREL has reached similar conclusions regarding wind generation.[130] Electric reliability has greatly improved as wind has been added in Texas,[131] and NERC recently noted that power

[126] NERC, *2014 Long-Term Reliability Assessment* (Nov. 2014) *available at* http://www.nerc.com/pa/RAPA/ra/Reliability Assessments DL/2014LTRA_ERATTA.pdf.
[127] Congress of the United States, Transcript of *Power America: A Review of the Operation and Effectiveness of the Nation's Wholesale Electricity Markets*, 36 (July 26, 2017) *available at* http://docs.house.gov/meetings/IF/IF03/20170726/106323/HHRG-115-IF03-Transcript-20170726.pdf.
[128] Michael Goggin, *PJM study quantifies wind's value for building a reliable, resilient power system,* (April 4, 2017) *available at http*://www.aweablog.org/pjm-study-quantifies-winds-value-building-reliable-resilient-power-system/.
[129] CAISO, "Using Renewables to Operate a Low-Carbon Grid: Demonstration of Advanced Reliability Services from a Utility-Scale Solar PV Planet." (2017) *available* online at https://www.caiso.com/Documents/UsingRenewablesToOperateLow-CarbonGrid.pdf.
[130] E. Ela, et al., *Active Power Controls from Wind Power: Bridging the Gaps,* (Jan. 2014) *available at* https://www.nrel.gov/docs/fy14osti/60574.pdf.
[131]ERCOT, "ERCOT Monthly Operational Overview," July 2017, page 6, *available at* http://www.ercot.com/content/wcm/key_documents_lists/27311/ERCOT_Monthly_Operational_Overview_201707.pdf.

system frequency response is noticeably higher when wind output is high in the state.[132] Grid operators in Texas and Colorado now regularly dispatch the output of wind plants up and down to balance electricity supply and demand, with a degree of speed and accuracy not available from conventional power plants.[133]

In sum, there are a range of operational and technical attributes that can contribute to reliable and resilient systems—and a broad range of technologies that can provide them. Renewables, natural gas, distributed energy resources and demand response, as well as other resources (including advanced small modular nuclear plant designs), work well together in markets to build a cost-effective, reliable and resilient energy mix.[134] The NOPR ignores these facts, instead singling out a preferred set of resources with a single attribute—a large supply of on-site fuel—for special protection from competition and guaranteed compensation. Because the focus on this single attribute has not been shown to be justified by any technical or operational needs of the system, and is not based on any accepted metrics or other measure of what performance is required to ensure "resilience," the NOPR would result in undue discrimination and preference and should be rejected.[135]

2. The NOPR would distort market prices, increase costs for consumers and needlessly undo organized competitive markets that have helped ensure

[132] NERC, "State of Reliability 2017," 163 (June 2017) *available at* http://www.nerc.com/pa/RAPA/PA/Performance%20Analysis%20DL/SOR_2017_MASTER_20170613.pdf.
[133] Michael Milligan, et al., IEEE POWER & ENERGY MAGAZINE, *Alternative No More*, (Nov./Dec 2015) *available at* http://iiesi.org/assets/pdfs/ieee-power-energy-mag-2015.pdf.
[134] Michael Goggin and Nathan Pedder, *Wind Energy and Natural Gas: A Bright Future*, (March 19, 2014) *available at http*://awea.files.cms-plus.com/WEF_Wind Gas White Paper_031914.pdf.
[135] *Contra, Advanced Energy Management Alliance v. FERC*, 860 F.3d 656, 670-71 (D.C. Cir. 2017) (finding that applying a single performance standard to differing technologies did not amount to undue discrimination because that standard was justified by "operational constraints" and established metrics).

just and reasonable rates and delivered reliable and resilient electric power supply for decades.

At the heart of the proposal is the selection and elevation of a single attribute (on-site fuel supply) of some generators. Based on that single attribute, the NOPR proposes an expansive re-regulation of certain electric generators that would have significant impacts on competition in organized wholesale electricity markets and on consumer costs. The NOPR is clearly not intended to improve market competition. As such, it is likely to lead to higher costs for tens of millions of consumers, producing the opposite result of what consumers expect in competitive markets with no corresponding improvement in reliability or resilience.

Markets have already proven the ability to greatly benefit consumers and give our electric system the flexibility needed to meet changing electricity demands, while ensuring the least-cost energy for consumers. The NOPR would greatly diminish the value of these markets and raise questions about their ability to function, putting in jeopardy the billions of dollars in annual consumer and reliability benefits these markets provide. PJM and MISO each provide around $3 billion in annual net customer benefits that could be lost if the NOPR were adopted.[136]

a. The NOPR would needlessly undo decades of successful developments in organized wholesale markets.

The Commission has repeatedly affirmed its policy that jurisdictional wholesale markets should utilize market mechanisms to ensure that the resulting rates are just and reasonable and not unduly discriminatory or preferential. Over the past two decades and across dozens of major orders, the Commission has promoted market competition among wholesale generators, including in the provision of ancillary services necessary to maintain reliability. The Commission relies

[136] PJM, *PJM Value Proposition* (last visited Oct. 23, 2017) *available at* http://www.pjm.com/about-pjm/value-proposition.aspx; MISO, *Value Proposition*, (last visited Oct. 23, 2017) https://www.misoenergy.org/WhatWeDo/ValueProposition/Pages/ValueProposition.aspx.

heavily on organized markets and their competitive forces to provide energy reliably and at least-cost and to set rates that are just and reasonable.[137]

The NOPR departs from that precedent abruptly without explaining why the problem it identifies requires a massive change in the market construct. In addition, the proposal does not explain why the alleged issue of reliability and resilience, even if true, cannot be resolved through a market mechanism.

The proposed requirement to assure "full cost compensation" for eligible resources would likely severely disrupt existing wholesale markets. Morgan Stanley analysts have warned that the proposal "would bring an end to competitive power markets,"[138] and J.P. Morgan similarly stated that "effectively re-regulating a major portion of the currently de-regulated organized markets via a cost-of-service system would presumably render any existing discernable market pricing mechanisms irrelevant."[139] Analysis from the Energy Innovation group summed it up by stating that the proposal " threatens to destroy wholesale markets with no tangible benefit."[140]

The Commission has highlighted the dangers to organized markets associated with such significant out-of-market actions in prior proceedings addressing reliability reforms.[141] Moreover, the Commission has consistently concluded that generators should only be "carved" out of the market and provided a full cost-of-service rate in narrow critical reliability situations, and only for

[137] See, e.g., New York Independent System Operator, Inc., 150 FERC ¶ 61,116 at P 2 (2015), citing PJM Interconnection, LLC, 110 FERC ¶ 61,053, at P 31 (2005) ("market clearing prices that reflect [reliability] costs better support efficient consumption and investment decisions"); ISO New England, Inc., 148 FERC ¶ 61,179 (2014), order on clarification, 150 FERC ¶ 61,029, at P 10 (2015) (if future winter reliability program is found to be necessary, it must be a market-based, rather than out-of- market, solution); ISO New England, Inc., 144 FERC ¶ 61,204, at P 42 (2013), reh'g denied, 109 FERC ¶ 61,157 (2004); see also Midwest Indep. Transmission Sys. Operator, Inc., 140 FERC ¶ 61,237, at P 63 (2012), order on compliance, 148 FERC ¶ 61,056, at P 42 (2014).

[139] *Id.*

[140] Robbie Orvis, *DOE Rulemaking Threatens to Destroy Wholesale Markets with no Tangible Benefit,* (Oct. 2, 2017) *available at* http://www.utilitydive.com/news/doe-rulemaking-threatens-to-destroy-wholesale-markets-with-no-tangible-bene/506289/./

[141] *See supra* note 17.

a limited period of time while market solutions are developed to address the problem.[142] These concerns have not been addressed in the NOPR.

b. The NOPR, if finalized, would distort market prices and the incentives produced by competitive wholesale markets

Basic economic theory dictates that paying a premium for the energy produced by coal and conventional nuclear plants that could otherwise retire, as the NOPR proposes, would be a highly distortionary market intervention and costly to consumers. As FERC staff's questions in this proceeding demonstrate, how implementation of the NOPR would impact market dispatch is somewhat of a mystery. However, to the extent the proposed energy payment directly affects generation dispatch by causing coal plants to operate instead of gas, wind, solar or other technologies, even when those technologies have lower marginal costs for producing electricity, the result would be distorted market outcomes and prices. In short, the NOPR would undermine the marginal cost design of organized wholesale energy markets.

Imposing cost-of-service rates would also reintroduce inefficiencies that market-based rates were intended to resolve. Most directly, cost-of-service rates inherently mute the beneficial incentive to reduce costs and increase efficiency that is one of the most valuable features of markets. In fact, after the introduction of competitive wholesale markets, many power plants responded by achieving major improvements in their capacity factors and reductions in their fixed and variable operating costs.

The NOPR fails to articulate why these benefits of competitive wholesale markets should be placed at risk for the sake of preserving certain preferred resources with the single attribute of

[142] Order Instituting Section 206 Proceeding and Directing Filing to Establish Reliability Must Run Tariff Provisions, 150 FERC ¶ 61,116, 2 (Feb. 19, 2015) (describing Commission's RMR policy and the short-term "backstop" nature of such agreements).

on-site fuel supply, and what reliability or resilience benefits would be produced that outweigh the loss of these beneficial market outcomes.

c. The NOPR would significantly increase costs for consumers fails to quantify those costs or demonstrate that they will produce commensurate benefits.

The costs associated with the NOPR's federally-mandated procurement of "resilient" fuel-secure resources would be significant, and have not been either acknowledged or quantified by the NOPR. Nor does the NOPR compare those costs against an articulation of the quantifiable reliability or resilience benefits that will be produced to determine if such costs are commensurate with those benefits and thus just and reasonable for consumers.

Cost of service based rates with returns on capital expenditures to coal and nuclear plants would ultimately be paid for by consumers. Given the uncertainty surrounding many elements of the proposed rule, such as the affected markets and the universe of potentially eligible resources within those markets, it is difficult for even sophisticated parties to evaluate the potential costs resulting from the proposed rate structure. However, ICF calculated that the proposal could add as much as $3.8 billion per year to consumer electric bills.[143] Analysis by the Brattle Group, filed separately in this docket, also found that the cost of direct payments was likely to range from $3.7 to $11.2 billion per year.[144] Another analysis concluded that "[c]onservative readings of this proposal suggest it could cost customers $2.4-10.6 billion per year."[145] The cost of these direct payments would be in addition to the potential loss of the

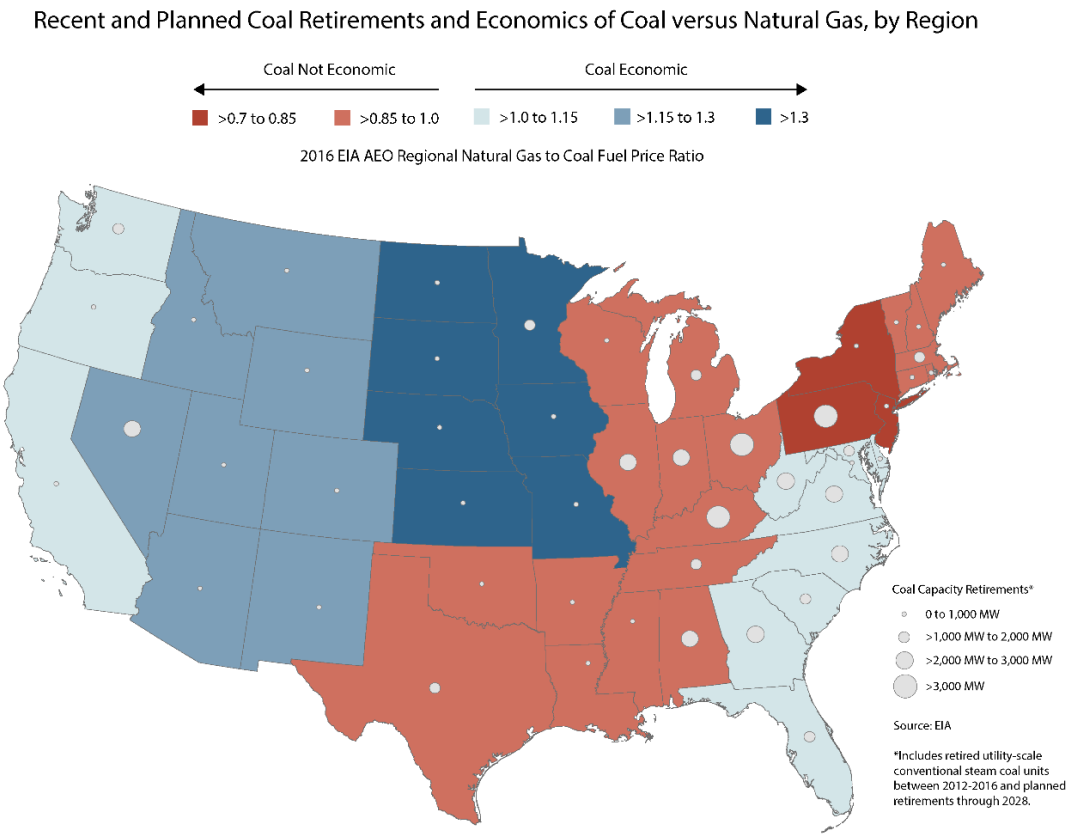
[143] Rich Heidorn Jr., *ICF Analysis: NOPR Cost Could near $4B/Year*, (Oct. 2, 2017) *available at* https://www.rtoinsider.com/icf-doe-nopr-76642/.
[144] Evaluation of the DOE's Proposed Grid Resiliency Pricing Rule, The Brattle Group (Oct. 23, 2017), attached to Joint Industry Comments Opposing the DOE NOPR, Docket No. RM18-1-000 (Oct. 23, 2017).
[145] http://energyinnovation.org/wp-content/uploads/2017/10/20171021_Resilience-NOPR-Cost-Research-Note-FINAL.pdf.

billions of dollars in consumer benefits provided by wholesale markets if the proposal undermined those markets, as discussed above. As Morgan Stanley warned, the proposal "would bring an end to competitive power markets, is not clearly needed to ensure grid reliability and resilience, and would be very expensive."[146]

Consumers will not just be harmed by the direct cost of the payments, but also the costs associated with continuing to operate uneconomic power plants and the potential retirement of competing resources that would have been economic but for the payments. Many experts have explained that coal and conventional nuclear power plants are retiring because they are no longer economic, and that retirement of uneconomic resources is a healthy outcome of a well-functioning market.[147] Most coal power plant retirements are unsurprisingly occurring in regions where coal generation is not economic relative to natural gas generation.[148] Additional analysis confirms that coal generators are retiring primarily because they cannot compete with low-cost natural gas generation.[149] Any policy intervention to halt those retirements will undermine market-based outcomes and inevitably result in more expensive electricity for consumers due to the market distortions discussed above. Making matters worse, imposing cost-of-service rates would reintroduce inefficiencies that market-based rates were intended to resolve. Most directly, cost-of-service rates mute the beneficial incentive to reduce costs and increase efficiency that is

[146] Lucas Bifera, *Wall Street Views DOE Grid Proposal as Anti-competitive*, (Oct. 2, 2017) *available at https*://marketintelligence.spglobal.com/our-thinking/news/wall-street-views-doe-grid-proposal-as-anticompetitive.
[147] Analysis Group, *Analysis Group Report Finds that the Transition Underway in the U.S. Power System Is Not Harming Reliability*, (June 20, 2017) *available at* http://www.analysisgroup.com/news-and-events/news/analysis-group-report-finds-that-the-transition-underway-in-the-us-power-system-is-not-harming-reliability/.
[148] Michael Goggin, *Renewable Energy Builds a More Reliable and Resilient Electricity Mix*, (May 2017) *available at* awea.files.cms-plus.com/FileDownloads/pdfs/AWEA Renewable Energy Builds a More Reliable and Resilient Electricity Mix.pdf.
[149] Union of Concerned Scientists, *A Dwindling Role for Coal*, (2017) *available at* http://www.ucsusa.org/clean-energy/coal-and-other-fossil-fuels/coal-transition#.WekAW3ZryUl.

one of the most valuable features of markets.



Given the NOPR's lack of a definition of resilience or articulation of a set of metrics around which to measure resilience and quantify any benefits provided by the NOPR, the Commission has no basis on which to assess the costs of the NOPR against the benefits that will result. Accordingly, the NOPR cannot be found to be just and reasonable.

C. The NOPR suffers from notice and procedural deficiencies that prevent the Commission from finding that it is just and reasonable or otherwise moving forward in this docket.

1. The lack of detail in the NOPR regarding its scope and how it might be implemented makes it impossible to determine if it is just and reasonable, and denies the public of adequate notice and the opportunity to provide meaningful comments.

The NOPR fails to provide basic principles and essential details necessary to give interested parties adequate notice and permit them to reasonably evaluate the proposed rule and provide meaningful comments.[150] These missing key details also prevent the Commission from determining if the NOPR is just and reasonable. With respect to the potential scope of the proposed rule, the eligibility of electric generating plants to receive cost-based compensation, and how those plants and the cost-based compensation construct would be integrated into the markets, the NOPR fails to offer explanation or details regarding numerous key questions. As we note in the Appendix A, the fact that many of FERC staff's questions in this docket seek more information on these missing details lays bare the fact that the NOPR is far too vague to constitute a valid proposal or permit meaningful comments.

The eligibility requirements for payments under the NOPR, for instance, are not adequately explained. While the NOPR focuses on the threatened loss of the electric grid's resilience as a result of premature retirements of fuel-secure resources, the proposed eligibility requirements do not appear to limit eligibility for payments to generation units that are at risk of retirement or that have otherwise been identified by the owner as slated for retirement.[151] In fact, no showing is required that a particular resource is failing to recover its costs.

The proposal also makes no apparent attempt to limit eligibility to units for which retirement might be found to be "premature"—there are no proposed criteria for excluding units

[150] A notice of proposed rulemaking must provide sufficient factual detail and rationale to permit interested parties to comment meaningfully. 5 U.S.C. § 553; *see also Florida Power & Light Co. v. U.S.*, 846 F.2d 765, 771 (D.C. Cir. 1988) ("The APA requires the Commission to provide notice of its proposed rulemaking adequate to afford interested parties a reasonable opportunity to participate in the rulemaking process. Such notice must not only give adequate time for comments, but also must provide sufficient factual detail and rationale for the rule to permit interested parties to comment meaningfully.") (internal citations omitted). The NOPR also raises concerns about legal sufficiency of notice under the Administrative Procedure Act in that the proposed requirements are so vaguely stated that it is hard to know what one is commenting on and how FERC's action would be authorized under section 206 or otherwise be consistent with the reservation of rights to states under section 201(a).

[151] For example, it does not exclude resources that are operating under long-term power sales agreements.

facing retirement due to old age, needed capital improvements that are uneconomic or other reasons. Eligibility does not even appear to depend on any unit-specific evaluation of the units' contribution to resilience. There is also no limitation to pre-existing units in the proposal, raising the question of whether new generating units built solely for the purpose of earning a guaranteed return without regard for market need or forecasted utilization would appear to qualify under the proposed rule.

In addition, the proposal is unclear about whether the added compensation provided to the subject generators is to be provided by changes to energy market rules, the creation of new ancillary service products, changes to capacity market structures or new out-of-market payments. It also provides no details regarding how those costs should be allocated to load-serving entities.

By lacking so many fundamental details, it is impossible for the Commission to conclude that the NOPR's solution will result in RTO/ISO tariff provisions that are just and reasonable; in particular, many of the missing details prevent the Commission and the parties ability to assess whether the NOPR is reasonably related to the articulated need of postponing retirements of otherwise retiring generation units, and narrowly tailored to apply to only those generating units required to support resilience needs. It also fails to provide interested parties an adequate opportunity to provide meaningful comment, as the proposal is so vague in its details.

2. The comment period and proposed timeline for finalization and implementation are inconsistent with the Administrative Procedure Act, Section 403 of the Department of Energy Reorganization Act.

The process and timeline directed by DOE for comments on the NOPR, and the comment period established by the Commission, are wholly insufficient to allow for stakeholders to provide meaningful input, or for the Commission to consider that input. The timeline is inconsistent with the Administrative Procedure Act, which requires "adequate time" to provide "meaningful

comment."[152] While the Administrative Procedure Act does not specify the minimum length of the public comment period, agencies commonly allow at least 60 days for typical rulemakings. Executive Order 12866 suggests that agencies allow the public at least 60 days to comment for "significant" rules and says that any comment period should be not less than 60 days "in most cases."[153] "For complex rulemakings, agencies may provide for longer time periods [than 60 days for comments], such as 180 days or more."[154]

To our knowledge, the Commission has never allowed less than 60 days for public comment on any major rulemaking. For instance, in the notice for Order No. 1000,[155] the Commission originally allowed 60 days for comments and then extended that deadline significantly,[156] as well as providing for an additional 45 days for reply comments.[157] Furthermore, we note that the Commission routinely grants at least 60 days for run-of-the-mill rulemakings (*e.g.*, establishing a 60-day comment period on a NOPR regarding the designation of exhibits for FERC hearings).[158]

Given the potentially broad scope of the NOPR, and the potential that it has to fundamentally alter the organized wholesale power markets, the 21-day comment period established by Commission fails to meet the Administrative Procedure Act requirements. It should also be noted that legal notice of the NOPR was not published in the *Federal Register* until October

[152] 5 U.S.C. §553.
[153] *Id.*
[154] A Guide to the Rulemaking Process Prepared by the Office of the Federal Register, 10, *available at* https://www.federalregister.gov/uploads/2011/01/the_rulemaking_process.pdf.
[155] *Transmission Planning and Cost Allocation by Transmission Owning and Operating Public Utilities*, Order No. 1000, 76 Fed. Reg. 49,842 (Aug. 11, 2011); FERC Stats. & Regs. ¶ 31,323, *order on reh'g*; Order No. 1000-A, 139 FERC ¶ 61,132 (2012), *order on reh'g and clarification*; Order No. 1000-B, 141 FERC ¶ 61,044 (2012) (providing that compliance filings were due within 18 months of the effective date of the rule).
[156] *See Notice extending comment period re Transmission Planning and Cost Allocation by Transmission Owning and Operating Public Utilities*, RM10-23-000 (Aug. 10, 2010).
[157] *See Notice of Proposed Rulemaking; notice providing for reply comments for Transmission Planning and Cost Allocation by Transmission Owning and Operating Public Utilities* Docket No. RM10-23-000 (Sep. 29, 2010).
[158] *See Revised Exhibit Submission Requirements for Commission Hearings*, 150 FERC ¶ 61,193 (Mar. 19, 2015).

10, 2017, resulting in effectively a 13-day comment period. In addition, compounding the problem, the version of the NOPR published in the *Federal Register* was different from the version issued by DOE and docketed by the Commission here, revising the scope of the NOPR's proposal to RTOs/ISOs with energy markets *and capacity markets*. Commenters were left with just 13 days to consider the ramifications of this change and provide meaningful comments.

In addition, we note that while the Department of Energy Organization Act requires the Commission to "consider and take final action on any proposal made by the Secretary . . . in an expeditious manner in accordance with such reasonable time limits as may be set by the Secretary," those time limits must be "reasonable." We do not believe that the initial 45-day comment deadline set by the Secretary is "reasonable," nor is the 21 days adopted by the Commission for initial comments. Neither time period affords the public a meaningful opportunity to comment on a matter of this importance and complexity.

Finally, the proposed timeline for RTOs/ISOs to implement the NOPR—15 days after a final rule becomes effective—is woefully inadequate to allow the RTOs/ISOs to consult with stakeholders, consider the ramifications of the final rule's requirements on all of its market features and operations, and develop a thoughtful compliance plan. Overlaying a broad cost-of-service reregulation of a significant amount of generation in the markets will have massive implications for market design that simply cannot be evaluated in such a short amount of time.

D. The Commission should focus on a careful evaluation of all potential aspects of electric system resilience and ongoing market reforms to improve price formation, rather than accept the NOPR's invitation to focus narrowly on fuel supply.

We agree with DOE that reliable service to customers is a priority for the electric sector, and if threats to reliability or resilience are found, appropriate regulatory action should be taken. While the record overwhelmingly demonstrates that no reliability or resilience emergency exists,

the Commission could certainly conduct a further examination of resilience if it believes such a step is warranted. What, if any, actions may be necessary to address reliance depends on having a firm understanding of what resilience means, as well as on numerous factors outside of the narrow issue of fuel supply teed up in the NOPR. Instead of finalizing the NOPR, the Commission should consider a range of additional steps to explore all aspects of the emerging concept of resilience and to improve the functioning of the wholesale markets.

As an initial matter, to properly address grid resilience, the Commission must do what the NOPR does not—develop a record that defines what is meant by "resilience," demonstrate whether or not current RTO/ISO markets and operational practices are achieving that defined resilience and, if necessary, whether new or modified market rules and practices are necessary to ensure that resilience is achieved in a manner that is just and reasonable and not unduly discriminatory or preferential. As explained throughout these comments, defining resilience and assessing whether the current RTOs/ISOs are adequately compensating it requires looking beyond the single issue of on-site fuel supply and at all the potential aspects of the electric system that could lack necessary resilience, including the transmission and distribution system (where, as noted above, most outages occur).[159] Moreover, major natural and man-made threats to grid resilience that may require action to address differ by region: in some areas, hurricanes may be the most prominent threat, while in others large snow storms, frigid cold or likelihood of vandalism, or other man-made events, may be a greater concern.

Moreover, just as there are many facets to defining and assessing grid resilience, there are many potential solutions available beyond simply retaining "fuel secure" generating resources that

[159] *See*, e.g., National Academies of Sciences, Engineering, and Medicine, Enhancing the Resilience of the Nation's Electricity System (June 2017) *available at* https://www.nap.edu/catalog/24836/enhancing-the-resilience-of-the-nations-electricity-system?gclid=EAIaIQobChMI9ceY8aj41gIVRAOGCh3xHwmuEAAYASAAEgJeOfD_BwE.

any Commission examination must consider, to guard against discriminatory outcomes like those proposed in the NOPR. For example, as explained above, renewables, like wind and solar, as well as the broader array of advanced energy technologies, including energy storage, demand-side solutions, and advanced metering and software solutions, all provide significant reliability and resilience benefits (including providing tools to manage major events and quickly recover from them).

In addition, given the results of analyses by the Rhodium Group and others showing that the vast majority of major outages lie in failures in the delivery system (i.e., transmission and distribution),[160] redoubling its efforts to improve and expand transmission infrastructure is one of the single most important steps the Commission could take to address reliability and resilience concerns. As DOE itself has documented:

> Transmission investments provide an array of benefits that include providing reliable electricity service to customers, relieving congestion, facilitating robust wholesale market competition, enabling a diverse and changing energy portfolio, and mitigating damage and limiting customer outages (resilience) during adverse conditions. Well-planned transmission investments also reduce total costs. SPP analyzed the costs and benefits of transmission projects from 2012–2014 and found that the planned $3.4 billion investment in transmission was expected to reduce customer cost by $12 billion. This yielded an estimated benefit of $3.50 for every dollar invested in the region.[161]

The SPP analysis noted in the DOE Staff Report calculated hundreds of millions of dollars in annual reliability benefits achieved through its transmission upgrades, accounting for about 1/3 of the total benefits provided. The reliability benefits alone were large enough to pay for the

[160] The Rhodium Group analysis, as mentioned above, correctly notes that weather events account for over 96.2% of electricity customer outage hours. Trevor Houser, et al., *The Real Electricity Reliability Crisis*, (Oct. 3, 2017) *available at* http://rhg.com/notes/the-real-electricity-reliability-crisis.

[161] U.S. Department of Energy, "Staff Report to the Secretary on Electricity Markets and Reliability," 75 (Aug. 2017) *available at* https://energy.gov/sites/prod/files/2017/08/f36/Staff%20Report%20on%20Electricity%20Markets%20and%20Reliability_0.pdf.

transmission investment, without accounting for the consumer savings and other benefits of the upgrades.[162]

Since there is no immediate reliability or resilience crisis, as explained above, the Commission has time to gather further information and consider these issues. One approach it could consider is the establishment of regional technical conferences that consider, among other things:

- What does resilience mean, both generally and to each RTO/ISO in the context of its market structure and resource mix?
- What level of resilience is optimal?
- Is resilience currently lacking in some/all RTO/ISO regions?
- If so, what are the economically efficient and non-discriminatory ways to incentivize and compensate resilience in each region without undermining existing market structures and just and reasonable rates?

This approach would afford stakeholders the ability to be meaningfully involved in the process, including states that have a primary role in resource adequacy decisions under section 201(a) of the FPA.

In addition, whether the Commission conducts this examination or not, it should move to finalize ongoing proceedings that already consider many of the issues raised in the NOPR and that have set forth, in a true deliberative process, substantial market reforms that would contribute to ensuring reliability and resilience. For example, the Commission has already proposed a number of price formation rulemakings, many of which have already been finalized as orders, to ensure

[162] SPP notes that even that figure is conservative, as it does not account for grid hardening and other resilience benefits of transmission. The report also notes that SPP utility Westar has reported a 40% reduction in customer outages due to transmission expansion. Southwest Power Pool, *The Value of Transmission*, 15-17 (Jan. 26, 2016) *available at* https://www.spp.org/documents/35297/the%20value%20of%20transmission%20report.pdf.

markets are properly valuing reliability and sending efficient price signals. The Commission should move to finalize the remaining rules as expeditiously as possible.

One such proceeding is a pending proposed rulemaking that would allow fast-start resources to set electricity market prices; this a step that would better value resource flexibility and the ability to quickly respond to disturbances on the grid, which all appear to agree is a key aspect of resilience.[163] The proposal enjoys widespread support across sectors of the electric industry, and could even be expanded to other types of resources to further improve price signals and resilience.[164]

The Commission is also addressing primary frequency response in another ongoing docket. Some of the undersigned have urged the Commission to establish a competitive market for the provision of primary frequency response service, rather than an inefficient command and control mandate.[165] Because different resources face vastly different costs for providing primary frequency response at different points in time, a market is perfectly suited for determining which resource should provide the service at any point in time. This would directly address concerns about proper compensation for the provision of reliability services, as resources that provide this service are not currently compensated.

The Commission has also proposed a rule that would require RTOs/ISOs to remove barriers to the participation of electric storage resources and distributed energy resource aggregations in organized markets, which would allow these resources to provide the reliability services that the

[163] *Fast-Start Pricing in Markets Operated by Regional Transmission Organizations Independent System Operators*, 157 FERC ¶ 61,213 (Dec. 15, 2016).
[164] United States Congress, Energy and Commerce Committee, *Part II: Powering America: Defining Reliability in a Transforming Electricity Industry* (Oct. 3, 2017) *available at* https://energycommerce.house.gov/hearings/part-ii-powering-america-defining-reliability-transforming-electricity-industry/./
[165] *See, e.g.,* Comments of the American Wind Energy Association, FERC Docket No. RM16-6-000 (April 25, 2016) *available at* https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14218259.

NOPR says are critical. This would also assist with price formation by making behind-the-meter demand and resources more responsive to price.[166]

Finally, the Commission should consider reviewing how ancillary services are provided today and consider whether, in light of technological advances and the changing needs of the grid, some of those services could be more efficiently designed and compensated. For example, technological advances now allow advanced energy technologies like wind plants to provide reactive power and voltage control. The Commission could consider developing a more streamlined method for compensating power plants that provide this service, as the current process of applying for cost-based compensation is so burdensome that many resources who provide the service do not apply.

In addition, as the grid continues to require additional flexibility (as demonstrated by the Brattle Group in 2016),[167] the Commission should again consider whether to expand the procurement of those services through market-based approaches. Creating robust ancillary services markets to procure needed grid reliability services in a technology—and fuel-neutral will ensure that consumers receive enhanced reliability and resilience while also continuing to receive the benefits and innovation that come from competition.[168] Doing so would also allow the many new advanced energy technologies that can provide these reliability and resilience services (described above) to compete to provide those services on a level playing field that is free of undue discrimination.

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[166] *Electric Storage Participation in Markets Operated by Regional Transmission Organizations and Independent System Operators*, Docket Nos. RM16-23-000 (Nov. 17, 2016).

[167] The Brattle Group, Advancing Past "Baseload" to a Flexible Grid (June 26, 2017) *available at* http://www.brattle.com/system/publications/pdfs/000/005/456/original/Advancing_Past_Baseload_to_a_Flexible_Grid.pdf?1498246224.

[168] This is consistent with the view of NERC that the industry should rethink how essential reliability services are procured as the resource mix changes. NERC, *Essential Reliability Services Task Force Measures Framework Report*, (Nov. 2015) *available at* http://www.nerc.com/comm/Other/essntlrlbltysrvcstskfrcDL/ERSTF%20Framework%20Report%20-%20Final.pdf.

Whatever the Commission chooses to do next, it must be cognizant of the fact that rules that restrict competition or arbitrarily discriminate against certain resource types will increase costs for consumers and not efficiently improve reliability and resilience. For example, changes to capacity market rules that undervalue the actual capacity contributions of specific resources will result in excessive costs for consumers by procuring more capacity than is needed. If the Commission does propose changes to energy, capacity, or ancillary services markets, it is essential that those markets be designed around the full range of actual reliability needs of the power system, with competition open to all resources that can perform those services. As explained above, DOE's proposal meets none of those criteria.

III. CONCLUSION

For the foregoing reasons, the undersigned respectfully request that the Commission consider these comments in making any final determination in the above-captioned proceeding.

Respectfully submitted,

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APPENDIX A

Answers to Staff Questions in the October 4 Notice

Need for Reform

1. What is resilience, how is it measured, and how is it different from reliability? What levels of resilience and reliability are appropriate? How are reliability and resilience valued, or not valued, inside RTOs/ISOs? Do RTO/ISO energy and/or capacity markets properly value reliability and resilience? What resources can address reliability and resilience, and in what ways?

There are many ways that reliability and resilience can be defined and measured. While "reliability" is arguably more well understood (and definitions of it are embodied in section 215 of the FPA, the reliability standards approved by the Commission under that statute, and in state statutes and regulations), resilience is still an evolving concept. The NOPR does not provide a definition of reliability (or explain whether it is looking to existing reliability standards as a definition) or resilience, and fails to acknowledge the large body of work on defining these concepts and assessing tools to improve them. However, the NOPR's sole focus on resources with on-site fuel supply seems to imply that fuel security is the dominant, and maybe only, attribute of resilient grid. A definition of resilience rooted in this sole attribute is deficient in many respects. As discussed in section II.A.1, on-site fuel supply does little by itself to improve reliability or resilience. In section II.B.1 of our comments, we describe many operational characteristics and attributes that can ensure reliability and resilience, and the many different technologies that can provide such services. Any definition of reliability and resilience that excludes resources currently providing these services or capable of providing them in the future while focusing on resources that do not is arbitrary and capricious.

Given the importance and complexity of the issue, we believe that a deliberative process is necessary to adequately answer these questions, including additional proceedings to define what is meant by "resilience," assess how it could be different among regions, and determine how it can be improved or enhanced in a manner that is just and reasonable and not unduly discriminatory or preferential.

2. The proposed rule references the events of the 2014 Polar Vortex, citing the event as an example of the need for the proposed reform. Do commenters agree? Were the changes both operationally and to the RTO/ISO markets in response to these events effective in addressing issues identified during the 2014 Polar Vortex?

We do not agree with the NOPR's characterization of the Polar Vortex. In sections II.A.2.a, we describe how the NOPR's summary of the Polar Vortex cherry picks certain facts about a handful of generating units' performance while ignoring the greater body of evidence that contradicts those facts. In section II.A.4.a-c, we discuss existing tools that already address the NOPR's stated intent of preventing premature retirements that could harm reliability or resilience, including market reforms put in place after the Polar Vortex.

3. The proposed rule also references the impacts of other extreme weather events, specifically hurricanes Irma, Harvey, Maria, and superstorm Sandy. Do commenters agree with the proposed rule's characterization of these events? For extreme events like hurricanes, earthquakes, terrorist attacks, or geomagnetic disturbances, what impact would the proposed rule have on the time required for system restoration, particularly if there is associated severe damage to the transmission or distribution system?

In sections II.A.4.a and II.D, we summarize recent studies and analyses, including some from DOE itself, concluding that most outages that occur from these kinds of events are caused by damage to the transmission and distribution system. These analyses show, as this question implies, that the proposed rule would have little if any impact on the time required for system restoration. In section II.B.1, we describe many of the ways that new, innovative technologies are improving the reliability and resilience of the electric power system including during the recent extreme weather events like Hurricane Harvey, Irma and Maria.

4. The proposed rule references the retirement of coal and nuclear resources and a concern from Congress about the potential further loss of valuable generation resources as a basis for action. What impact has the retirement of these resources had on reliability and resilience in RTOs/ISOs to date? What impact on reliability and resilience in RTOs/ISOs can be anticipated under current market constructs?

The NOPR fails to demonstrate that economic retirements are threatening the reliability and resilience of the grid. According to DOE's own Staff Report and the NERC assessments which the NOPR cites, the grid is reliably adapting to the changing resource mix (see section II.A.2.a-c). According to other reports from independent analysts and the RTOs/ISOs themselves, there is no reliability or resilience emergency to warrant the action posed by the NOPR (see section II.A.3.a-b). There are already mechanisms, such as RMR contracts, that serve as an adequate backstop to prevent economic retirements from impacting grid operations (see section II.A.4.c). While grid reliability and resilience can always be improved, the specific action taken by the NOPR would not achieve this objective.

5. Is fuel diversity within a region or market itself important for resilience? If so, has the changing resource mix had a measurable impact on fuel diversity, or on resilience and reliability?

Reliability and resilience can be maintained by building a grid that is more flexible, intelligent and diverse. There are a wide-range of advanced energy technologies available in the market today that can cost effectively improve reliability and resilience. Across the RTOs/ISOs, fuel diversity is higher than ever. Organized wholesale markets should provide a platform for technologies to provide reliability and resilience at least cost, rather than focus on preserving a specific fuel source (see section II.B.1). The NOPR and the available evidence provides no basis to conclude that the changing resource mix has had any measurable impact on fuel diversity, or on resilience and reliability.

Eligibility

General Eligibility Questions

1. In determining eligibility for compensation under the proposed rule, should there be a demonstration of a specific need for particular services? What should be the appropriate triggering and termination provisions for compensation under the proposed rule?

2. As the proposed rule focuses on preventing premature retirements, should a final rule be limited to existing units or should new resources also be eligible for cost recovery?

3. Should it also include repowering of previously retired units? Alternatively, should there be a minimum number of MW or a maximum number of MW for resources receiving cost-of service payments for resilience services? If so, how should RTOs/ISOs determine this MW amount? Should this also include locational and seasonal requirements for eligible resources?

4. Are there other technical characteristics that should be required for an eligible unit besides on-site fuel capability? If so, what are those technical characteristics and what benefits do they provide? What types of resources can meet the proposed eligibility criteria of the proposed rule? What proportion of total current generating capacity does this represent?

5. If technically capable of sustaining output for a sufficient duration (and meeting other relevant requirements), should resources such as hydroelectric, geothermal, dual-fuel with adequate on-site storage, generating units with firm natural gas contracts, or energy storage (each of which might have a demonstrable store of energy to draw upon to sustain an electrical output, if not necessarily fuel) also be eligible? Why or why not? If technical capability is the appropriate criterion for eligibility, what specific technical capability should be required to be eligible?

6. The proposed rule would require that eligible resources be able to provide essential energy and ancillary reliability services and includes a non-exhaustive list of services. What specific services should a resource be required to provide in order to be eligible?

7. The proposed rule would limit eligibility to resources that are not subject to cost of service rate regulation by any state of local regulatory authority. How should the Commission and/or RTOs/ISOs determine which resources satisfy this eligibility requirement?

The specific questions in this section demonstrate that the NOPR is far too vague to allow for meaningful comment. Moreover, the questions overwhelmingly demonstrate that the proposal's eligibility requirements are unduly discriminatory and preferential on their face. The NOPR provides a reliability and resilience payment to a subset of preferred generators, even though

many other technologies can provide the same—and often superior—reliability and resiliency values (see section II.B).

90-day Requirement

1. The proposed rule defines eligible resources as having a 90-day fuel supply. How should the quantity of a given resource's 90 days of fuel be determined? For example, should each resource be required to have sufficient fuel for 24 hours/day and sustained output at its upper operating limit for the entire 90-day period? Would there be any need for regional differences in this requirement?

The ability to store fuel on-site for any length of time does not inherently improve reliability or resilience. Many resources can provide generation, capacity or ancillary services without using *any* fuel supply, on-site or otherwise. These include wind, solar, demand response, energy storage and a host of other enabling or IT-enabled technologies (see section II.B.1). Again, we note that the details this question seeks demonstrates that the NOPR is too vague to constitute a valid proposal or permit meaningful comments.

2. Is there a direct correlation between the quantity of on-site fuel and a given level of resilience or reliability? Please provide any pertinent analyses or studies. If there is such a correlation, is 90 days of on-site fuel necessary and sufficient to address outages and adverse events? Or is some other duration more appropriate?

There is no correlation between the presence of on-site fuel supply and reliability or resilience. Our comments highlight numerous examples and studies that show that resources with on-site fuel supply can be vulnerable rather than resilient during extreme weather events (sections II.A.1-4 and II.D). Comprehensive analyses of recent power outages reveal that fuel supply related outages are trivial. Moreover, outages due to damage to transmission and distribution infrastructure, which are not trivial in frequency or duration, would not be reduced or mitigated by the presence of on-site fuel supplies (see section II.A.1).

Fuel Supply Requirement

1. The proposed rule requires that resources must be in compliance with all applicable environmental regulations. How should environmental regulations be considered when determining eligibility? For example, if a unit that was capable of keeping 90-days of fuel on-site was subject to emission limits that would prevent it from running at its upper operating limit for 90 days, should that unit be eligible under this proposed rule?

The FPA does not give the Commission the authority to supersede environmental regulations. Moreover, the units in question are generally not essential for reliability or resilience (see section II.A.1-4). To the extent that specific units are essential for reliability or resilience, RMR contracts and other backstops for preserving reliability and resilience are available (see section II.A.4.c). The cost of compliance with these regulations is the responsibility of the asset owner and a cost of doing business.

2. As the proposed rule references the need for resilience due to extreme weather events, including hurricanes, should there be any other eligibility criteria for the resource or fuel supply (e.g., storm hardening)? What considerations should be given to the vulnerability of 90-day fuel supplies to natural or man-made disasters such as extreme cold temperatures, icing, flooding conditions, etc. that may impact the on-site fuel supply?

We recommend a number of steps that can be taken to improve the reliability and resilience of the grid without giving undue preference to specific resource types (section II.D). The fact that on-site fuel supply is vulnerable during extreme weather and other events—as demonstrated by flooding and waterlogged coal piles during recent hurricanes, and frozen coal piles during the Polar Vortex—should be a primary consideration and should prevent the Commission from moving forward with the proposal. This vulnerability demonstrates unequivocally that these resources should not be given undue preference under the guise of the undefined concept of "resilience."

3. Does the vulnerability or non-availability of on-site fuel supplies vary depending upon fuel type, location, region, or other factors?

Reliability and resilience (to the extent it has been studied to date) are inherently local concepts. The reliability and resilience needs of the power system vary significantly from one location to another (see section II.A.4.a). This is true of the vulnerability of on-site fuel supplies as demonstrated by freezing and flooding of on-site coal piles. Some amount of deference in reliability and resilience planning to state, local and regional authorities is necessary.

Implementation

1. How would eligible resources receiving cost of service compensation under the proposed rule be committed and dispatched in the energy market?

2. How would eligible resources receiving cost based compensation under the proposed rule be considered in the clearing and pricing of centralized capacity markets?

3. What is the expected impact of this proposed rule on entry of new generation, reserve margins, retirement of existing resources, and on resource mix over time?

4. Should there be performance requirements for resources receiving compensation under the proposed rule? If so, what should the performance requirement be, and how should it be measured, or tested? What should be the consequence of not meeting the performance requirement?

5. Should there be any restrictions on alternating between market-based and cost-based compensation?

We assert that the specific questions in this section again demonstrate that the NOPR is too vague to constitute a valid proposal or to permit meaningful comments. Moreover, before proceeding to impose new rates or market rules, the Commission must first determine that the existing rates and market rules on file are not just and reasonable. The NOPR provides no basis for making this critical threshold finding. Accordingly, the Commission's inquiry under section 206 of the FPA should be at an end.

In addition, the NOPR is clearly unjust and unreasonable and unduly discriminatory. For example, there are only two choices for dispatching units that receive the unjust, unreasonable and discriminatory compensation proposed here: (1) dispatching them in a preferential manner ahead of more economic natural gas, wind and solar resources with lower marginal costs; or (2) allowing them to continue to be rarely dispatched based on economic merit order, resulting in consumers paying the full cost of service of these units while receiving nothing in return. Both of those choices are plainly unjust and unreasonable and unduly discriminatory or preferential.

Rates

1. The proposed rule lists compensable costs that should be included in the rate as operating and fuel expenses, costs of capital and debt, and a fair return on equity and investment. Are there other costs that would be appropriate to be included in the rate? Would any of the listed costs be inappropriate for inclusion?

2. Should wholesale market revenues offset any cost of service payments stemming from the proposed rule?

3. How should RTOs/ISOs allocate the cost of the proposed rule to market participants?

4. How would the requirement that eligible resources receive full cost recovery be reconciled with the requirement, as stated in the regulatory text, that resources be dispatched during grid operations?

We again contend that the specific questions in this section demonstrate that the NOPR is too vague to constitute a valid proposal or to permit meaningful comment. Moreover, the Commission should not proceed to consider these questions in any event. If it is not first determined that the existing tariffs are unjust and unreasonable, the Commission has no authority to proceed to establish a new just and reasonable rate. Since the NOPR fails to make this first required determination, the Commission should not implement the NOPR.

Other

1. The proposed requirement for submitting a compliance filing is 15 days after the effective date of any Final Rule in this proceeding, with the tariff changes to take effect 15 days after the compliance filings are due. Please comment on the proposed timing, both to develop a mechanism for implementing the required changes and to implement

those changes, including whether or not such changes could be developed and implemented within that timeframe.

The proposed implementation timeline of 15 days is patently unreasonable. Such a short time frame will not permit the RTOs/ISOs to consider the full impacts of any final rule on their markets, work with their stakeholders on compliance proposals, submit those proposals to the Commission for approval and make any necessary software changes needed for implementation.

2. Please comment on the proposed rule's estimated burden of $291,042 per respondent RTO/ISO, to develop and implement new market rules as proposed, including the potential software upgrades required to do so.

3. Please describe any alternative approaches that could be taken to accomplish the stated goals of the proposed rule.

We recommend a number of steps that can be taken to improve the reliability and resilience of the grid without giving undue preference to specific resource types (see section II.D).

4. What impact would the proposed rule have on consumers?

In section II.B.2.a-c, we describe the impact on of the rule on wholesale market prices and on consumers. Most notable is the massive price tag for consumers, estimated at as much as $4 billion *annually*.

5. The Commission may take notice of relevant public information, including information in other Commission proceedings. If a commenter views information in another Commission proceeding as relevant to the proposed rule, please identify that information and explain how it is relevant to the proposed rule. Such information may include a filing previously submitted by the commenter.

Section II.D of our comments notes several actions that the Commission is currently undertaking, which would be a more appropriate venue to address reliability and resiliency challenges and how market mechanisms can be used to address them.