

**UNITED STATES OF AMERICA  
BEFORE THE  
FEDERAL ENERGY REGULATORY COMMISSION**

Grid Resilience in Regional Transmission                    )  
Organizations and Independent System                    )       Docket No. AD18-7-000  
Operators    )

**REPLY COMMENTS OF  
THE PJM CONSUMER REPRESENTATIVES**

Pursuant to the Federal Energy Regulatory Commission’s (“Commission” or “FERC”) March 20, 2018 Order Extending Time for Comments,<sup>1</sup> the PJM Consumer Representatives hereby file these Reply Comments in the above-captioned proceeding. For purposes of these Reply Comments, the PJM Consumer Representatives are comprised of:

- American Forest and Paper Association
- American Foundry Society
- American Iron and Steel Institute
- American Municipal Power, Inc.
- Delaware Public Service Commission
- The Division of the Public Advocate for the State of Delaware
- Illinois Industrial Energy Consumers
- Industrial Energy Consumers of America
- Industrial Energy Users-Ohio
- New Jersey Rate Counsel
- People’s Counsel for the District of Columbia
- PJM Industrial Customer Coalition
- West Virginia Energy Users Group

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<sup>1</sup> *Grid Resilience in Regional Transmission Organizations and Independent System Operators*, 162 FERC ¶ 61,256 at P 3 (Mar. 20, 2018).

## I. INTRODUCTION AND PROCEDURAL BACKGROUND

On September 28, 2017, pursuant to Section 403 of the Department of Energy (“DOE”) Act,<sup>2</sup> the Secretary of the United States DOE (“Secretary”) proposed a rule for final action by the Commission within 60 days from publication in the *Federal Register*.<sup>3</sup> On October 2, 2017, the Commission issued a notice of proposed rulemaking, establishing October 23, 2017, and November 7, 2017, as the deadlines for submitting initial and reply comments, respectively.<sup>4</sup>

On October 4, 2017, FERC Staff issued a *Request for Information Regarding Section 403 of the Department of Energy Organization Act’s Proposed Rule for Final Action*.<sup>5</sup> FERC Staff’s Information Request presented more than fifty questions on approximately eight issues and sub-issues for public comment as part of the proposed rulemaking process. Numerous comments and reply comments were filed in response to FERC Staff’s Information Request, largely in opposition to the Proposed Rule.

On January 8, 2018, the Commission issued an Order Terminating Rulemaking Proceeding, Initiating New Proceeding, and Establishing Additional Procedures (“Grid Resilience Order”).<sup>6</sup> In the Grid Resilience Order, the Commission (1) terminated the proceeding regarding the Proposed Rule on Grid Reliability and Resilience Pricing that had focused on providing cost-of-service compensation to generators with on-site fuel capability, and (2) initiated the instant

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<sup>2</sup> 42 U.S.C. § 7173 (2012).

<sup>3</sup> Grid Reliability and Resiliency Pricing Rule, 82 Fed. Reg. 46940 (2017) (to be codified at 18 C.F.R. pt. 35).

<sup>4</sup> Notice Inviting Comments, *Grid Reliability and Resilience Pricing*, Docket No. RM18-1-000 (Oct. 2, 2017).

<sup>5</sup> Request for Information, *Grid Reliability and Resilience Pricing*, Docket No. RM18-1-000 (Oct. 4, 2017) (“Information Request”).

<sup>6</sup> *Grid Resilience in Regional Transmission Organizations and Independent System Operators*, 162 FERC ¶ 61,012 (2018) (“Grid Resilience Order”).

proceeding on Grid Resilience in Regional Transmission Organizations and Independent System Operators. The Grid Resilience Order directed each Regional Transmission Organization (“RTO”) and Independent System Operator (“ISO”) to submit initial comments and responses to the Commission on resilience to enable the Commission to holistically examine the resilience of the bulk power system.<sup>7</sup>

On March 9, 2018, PJM Interconnection, L.L.C. (“PJM”) and other RTOs/ISOs submitted comments and responses to the Grid Resilience Order. On March 20, 2018, the Commission issued an Order Extending Time for Comments, extending the deadline to May 9, 2018, for interested entities to submit reply comments in response to the comments of the RTOs/ISOs and to provide their perspective and recommendations regarding grid resilience.<sup>8</sup>

On May 8, 2018, CAISO, ISO-NE, MISO, NY-ISO, and SPP filed Joint Comments asking the Commission not to impose the actions or deadlines identified in PJM’s comments on all RTOs/ISOs.<sup>9</sup>

The PJM Consumer Representatives hereby submit these Reply Comments.

## **II. EXECUTIVE SUMMARY**

In the Grid Resilience Order, the Commission sought comments from grid operators and interested stakeholders to allow the Commission to “examine holistically the resilience of the bulk power system”<sup>10</sup> and to determine whether additional actions by the Commission and the

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<sup>7</sup> Grid Resilience Order at P 1 (further explaining that the “resilience of the bulk power system will remain a priority of this Commission”).

<sup>8</sup> See *Grid Resilience in Regional Transmission Organizations and Independent System Operators*, 162 FERC ¶ 61,256 at P 3 (Mar. 20, 2018).

<sup>9</sup> Joint RTO/ISO Comments, Docket No. AD18-700 (filed May 8, 2018).

<sup>10</sup> Grid Resilience Order at P 1.

RTOs/ISOs on resilience are needed and warranted. This proceeding should be limited to resilience planning and the criteria, standards, and best practices for mitigating disruptive high-impact, low-frequency events that threaten the bulk electric system. This proceeding should not encompass any evaluation of potential PJM market modifications, as such changes are currently being evaluated in other stakeholder processes and in other Commission proceedings.

The Commission, RTOs/ISOs, market participants, and policymakers increasingly refer to “resilience,” but the meaning of “resilience” remains vague and undefined. The challenge in applying the amorphous concept of resilience to the electricity grid is that objective engineering-based standards have performed admirably in facilitating the efforts of utilities, market participants, and customers to foster and ensure reliability. Any effort to adopt an amorphous concept creates a substantial risk that costs will be sunk with no credible basis for evaluating the value of the investment. Resilience must be clearly defined to determine what it is—and what it is not—so that any additional costs sought to be imposed on customers can be evaluated to ensure they are just, reasonable, and not unduly discriminatory.

The PJM Consumer Representatives recognize that PJM has offered alternatives to the Commission’s definition of resilience and the risks that purportedly required Commission intervention, including extreme weather, electromagnetic pulses, geomagnetic disturbances, earthquakes, cyber and physical attacks, and fuel security. Further discussion and information are needed regarding the distinctions in views and proposed definitions of resilience between the Commission, PJM, and other stakeholders. Absent a common understanding and uniform definition, ensuring resilience is neither measurable nor auditable. Consequently, calibrating any such investment to ensure that consumers are not saddled with unnecessary costs, under the guise of “resilience,” presents a significant challenge that must be addressed to ensure that rate results comport with the Federal Power Act. The Commission should require more vetting in the

stakeholder process and more industry discussion regarding the valuation of resilience in transmission planning processes (*e.g.*, through the NERC standard-setting process) before the Commission makes any decision that would require RTO/ISO implementation of resilience planning criteria. Further, in the PJM stakeholder process, the concept of resilience is being addressed in individual “silos,” crossing energy and capacity markets, transmission planning, and operations. Especially in the absence of any specific reliability metrics on resilience, the Commission should encourage RTOs/ISOs, including PJM, to guard against duplication of resilience-driven efforts that yield little incremental reliability benefit.

Resilience, as a general concept, is already an element of system planning, reliability assessments, and independent reliability standards. Therefore, the Commission should first evaluate the extent to which “resilience”—once properly defined—is already embedded in existing requirements and processes. When adding specific criteria, metrics, standards, or requirements to the existing reliability standards and regulatory framework, the Commission should employ cost-benefit analyses, prudence assessments, and evaluations of the ability of entities to finance any extensive resilience efforts. Any ability to deploy non-market operations during a resilience-related emergency, as PJM requests, must be subject to clear, objective, transparent, and auditable conditions and actions that trigger and control such non-market operations.

Any additional steps on gas-electric coordination should narrowly focus on prudent efforts to ensure reliability and resilience. The Commission should not impose a mandate on electric generators to procure firm interstate natural gas pipeline capacity.

Finally, the 2014 Polar Vortex and the 2017-2018 Cold Snap/“Bomb Cyclone” weather events do not justify subsidizing—directly or indirectly through changes in energy price formation rules—uneconomic coal and nuclear units in PJM in the name of resilience. If any

reliability/resilience concerns were to arise in PJM due to generation unit retirements, PJM has in place adequate processes and plans for addressing those concerns.

### III. REPLY COMMENTS

Unlike the Comments of the other RTOs/ISOs, PJM's Comments embark on an aggressively activist course, advocating positions that could result in substantial changes to PJM energy and capacity market rules, in addition to whatever changes may be necessary in transmission planning and system operations rules. Throughout these Reply Comments, the PJM Consumer Representatives will point out the inconsistencies between the positions of PJM and the positions being advocated by other RTOs/ISOs. Such inconsistencies, from an operational and regional perspective (*e.g.*, weather, fuel sources, geography, etc.),<sup>11</sup> indicate the need for uniform standards but with allowance for regional flexibility in implementing those standards. A one-size-fits-all approach to implementation of grid resilience measures is not likely to be the optimal solution.<sup>12</sup>

#### A. **This Proceeding Should Be Limited to Confirming That Resilience Planning and Mitigation Is Adequately Addressed in Existing Reliability Standards.**

In the Grid Resilience Order, the Commission sought comments from grid operators and interested stakeholders to allow the Commission to “examine holistically the resilience of the bulk

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<sup>11</sup> *See, e.g.*, CAISO Comments at 5 (explaining the CAISO footprint faces natural threats from earthquakes, drought, and fires instead of hurricanes and extreme cold weather that threatens other regions), ISO-NE Comments at 1-2, 4-8 (explaining that it faces harsher winters than other regions and that fuel security is the most significant challenge for New England). CAISO also explained that, unlike other regions, it has no baseload coal, only one nuclear plant (set to retire in 2024), and fewer natural gas-fired resources. CAISO Comments at 5.

<sup>12</sup> *See, e.g.*, MISO Comments at 2, 7 (seeking flexible Critical Infrastructure Protection standards), 10-11 (seeking MISO operational flexibility), NYISO Comments at 12-14, 31-32, CAISO Comments at 1-2, 10-12, ISO-NE Comments at 5-12, 20-32, 44.

power system”<sup>13</sup> and to determine “whether additional actions by the Commission and the ISOs/RTOs are warranted with regard to resilience issues.”<sup>14</sup> The Commission explained that the goal of this proceeding is (1) to develop a common understanding among the Commission, industry, and others of what resilience of the bulk power system means and requires; (2) to understand how each RTO and ISO assesses resilience in its geographic footprint; and (3) to use this information to evaluate whether additional Commission action regarding resilience is appropriate at this time.<sup>15</sup>

In its Comments to the Commission’s Grid Resilience Order, PJM recommends that the Commission finalize the definition of grid resilience and “clarify[] that resilience resides within the Commission’s existing authority with respect to the establishment of just and reasonable rates.”<sup>16</sup> As support for that assertion, PJM cites to Section 215 of the Federal Power Act (“FPA”), which provides the Commission with jurisdiction over reliability and statutory authority over the Electric Reliability Organization that establishes and enforces reliability standards.<sup>17</sup> PJM states that resilience efforts will require changes to transmission and infrastructure planning, operation rules, and market rules. Section 205 is the authority under which PJM proposes revisions to the PJM Open Access Transmission Tariff (“PJM Tariff”) and, with the requisite stakeholder support, changes to the PJM Operating Agreement.<sup>18</sup> PJM appears to seek a clear Commission statutory finding and interpretation that resilience also falls within the Commission’s authority under

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<sup>13</sup> Grid Resilience Order at P 1.

<sup>14</sup> *Id.* at P 13.

<sup>15</sup> *Id.* at P 18.

<sup>16</sup> PJM Comments at 5, Docket No. AD18-7-000 (filed Mar. 9, 2018) (citing Section 215 of the Federal Power Act, 16 U.S.C. § 824o).

<sup>17</sup> Section 215(b) of the FPA, 16 U.S.C. § 824o.

<sup>18</sup> Section 205 of the FPA, 15 U.S.C. § 824d.

Section 205 so that PJM can obtain new authority and the latitude to file under FPA Section 205 a plethora of market rule changes under the banner of resilience.

In its Comments, PJM fails to cite to any case law or other authority to support PJM's position that any notion of resilience resides within the Commission's statutory authority under Section 205 of the FPA. The purpose of this proceeding is to allow the Commission to "examine holistically the resilience of the bulk power system"<sup>19</sup>—not to clarify or expand the Commission's legal authority under the Federal Power Act so that an RTO/ISO can more easily advance particular market changes or modify market rules under the banner of resilience pursuant to Section 205 of the FPA. Congress added Section 215 to the Federal Power Act in 2005 to ensure that the reliability of the nation's bulk power system was subject to mandatory reliability standards and enforcement of those standards by an independent entity.<sup>20</sup> Thus, FPA Section 215, not Section 205, more appropriately grants the Commission authority over reliability/resilience issues. While the Commission has an important role in ensuring resilience of the electric grid, resilience is a shared role. Any action taken by the Commission should coordinate efforts with, without impinging upon the authority of, state and local regulators.<sup>21</sup> This proceeding should be limited to resilience planning and developing further measures, as necessary, to mitigate potentially disruptive high-impact, low-frequency events that threaten the resiliency of the bulk power grid.

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<sup>19</sup> Grid Resilience Order at P 1.

<sup>20</sup> *Alcoa Inc. v. FERC*, 564 F.3d 1342, 1344 (D.C. Cir. 2009); *New York v. FERC*, 783 F.3d 946, 950 (2nd Cir. 2015). Prior to 2005, the industry was not subject to mandatory reliability standards and enforcement of those standards by an independent entity; instead, the industry relied on voluntary compliance by certain industry participants. *Id.*

<sup>21</sup> FPA Section 215(a) specifically excludes "facilities used in the local distribution of electric energy" from the definition of the bulk power system. 16 U.S.C. § 824o.



**B. The Commission’s Definition and Evaluation of Resilience Should Not Be Limited to RTOs/ISOs Because Grid Resilience Broadly Impacts the Bulk Electric System.**

In the Grid Resilience Order, the Commission proposed and sought comment on the following definition for resilience:

The ability to withstand and reduce the magnitude and/or duration of disruptive events, which includes the capability to anticipate, absorb, adapt to, and/or rapidly recover from such an event.<sup>22</sup>

In its Comments, PJM recommended the following changes to that definition:

The ability to withstand ~~and~~ or reduce the magnitude and/or duration of disruptive events, which includes the capability to ~~anticipate~~, identify vulnerabilities and threats, and plan for, prepare for, mitigate, absorb, adapt to, and/or ~~rapidly~~ timely recover from such an event.<sup>23</sup>

In recommending those changes, PJM explained that it wants to ensure that the definition of resilience “is realistic and requirements on RTOs are achievable.”<sup>24</sup> From PJM’s explanation, PJM’s view is evident that the definition of resilience will impose certain requirements on PJM, and PJM seeks to minimize its potential future liability or responsibility by replacing the “and” with “or,” deleting “anticipate,” and replacing “rapidly” with “timely.”

In its Comments, PJM recognized that the Commission’s proposed definition of resilience is “consistent with general industry concepts concerning resilience”<sup>25</sup> and is similar to NERC’s definition of resilience:

The ability to reduce the magnitude and/or duration of disruptive events. The effectiveness of a resilient infrastructure or enterprise depends upon its ability to

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<sup>22</sup> Grid Resilience Order at P 23.

<sup>23</sup> PJM Comments at 10. PJM used the strikethrough feature to recommend deletions and the underline feature to recommend additions.

<sup>24</sup> *Id.*

<sup>25</sup> *Id.* at 9.

anticipate, absorb, adapt to, and/or rapidly recover from a potentially disruptive event.<sup>26</sup>

PJM has failed to demonstrate or explain why the Commission, in developing a *common understanding of resilience*, should depart from NERC’s definition of resilience or the Commission’s similarly proposed definition, both of which are consistent with the general industry understanding of resilience. NERC recognizes that “[i]t will not be possible to meet all electricity consumers’ demands for rapid restoration of service as entities prioritize their work and limited resources” in response to a severe event.<sup>27</sup> Therefore, PJM should not be concerned that the Commission’s proposed definition of resilience could impose any heightened or unrealistic responsibilities on PJM. Notably, in their Comments, other grid operators did not propose material changes to the Commission’s suggested definition of *resilience*.<sup>28</sup>

Because many organizations in various industries and persons in various disciplines—from electricity to national security to cybersecurity—are tasked with ensuring grid resilience, the definition of resilience should not be RTO-centric or linked to or limited by any requirements that the Commission imposes on RTOs/ISOs. Rather, the concept and definition of resilience should

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<sup>26</sup> NERC, *Severe Impact Resilience: Considerations and Recommendations*, at 12 (Board Accepted May 9, 2012). Available at [https://www.nerc.com/comm/OC/SIRTF%20Related%20Files%20DL/SIRTF\\_Final\\_May\\_9\\_2012-Board\\_Accepted.pdf](https://www.nerc.com/comm/OC/SIRTF%20Related%20Files%20DL/SIRTF_Final_May_9_2012-Board_Accepted.pdf). In 2012, NERC recognized that the electricity industry had less experience in planning for and responding to low-probability, high impact events. *Id.* at 1.

<sup>27</sup> *Id.* at 2. Available at [https://www.nerc.com/comm/OC/SIRTF%20Related%20Files%20DL/SIRTF\\_Final\\_May\\_9\\_2012-Board\\_Accepted.pdf](https://www.nerc.com/comm/OC/SIRTF%20Related%20Files%20DL/SIRTF_Final_May_9_2012-Board_Accepted.pdf).

<sup>28</sup> See, e.g., MISO Comments at 9-11 (indicating that the Commission’s definition could be even broader in scope), NYISO Comments at 2-5 (supporting the Commission’s proposed definition and emphasizing that reliability and resilience are not separate concepts), SPP Comments at 2-3 (noting that Commission’s definition is reasonable and consistent with NERC’s framework), ISO-NE Comments at 4-5, CAISO Comments at 6-10, ERCOT Comments at 2-3 (agreeing with FERC’s proposed definition).

be uniform and clear. As explained by MISO, the Commission’s proposed definition of resilience “recognizes that resilience is not just a fuel security matter, but encompasses careful coordination between transmission, operations and markets, information technology, cybersecurity, and system planning functions.”<sup>29</sup>

Furthermore, risks to the resilience of the bulk electric system are not limited to just RTOs/ISOs and the electric industry.<sup>30</sup> Resilience also includes the ability to respond to transformative industry changes in fuel economics, environmental regulations, technology, information technology and cybersecurity, customer trends and preferences, and state and federal laws and policies.<sup>31</sup> Therefore, responsibilities for ensuring resilience are and should continue to be shared by transmission and generation owners, fuel suppliers and transporters, federal agencies, state and local regulators, RTOs/ISOs, reliability organizations, consumer groups, environmental groups, and other entities.<sup>32</sup>

### **C. Resilience Is Already a Critical Part of Reliability Assessments.**

In the Grid Resilience Order, the Commission explained that it has previously “taken action to address reliability and other issues with regard to the bulk power system that have helped with the bulk power system’s resilience,” even though the Commission may not have used the term *resilience*.<sup>33</sup> Such Commission efforts to address resilience included gas-electric coordination, examination of the 2014 Polar Vortex, review of RTO/ISO fuel assurance measures, and capacity

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<sup>29</sup> See MISO Comments at 3.

<sup>30</sup> See CAISO Comments at 8.

<sup>31</sup> See MISO Comments at 3.

<sup>32</sup> See CAISO Comments at 8.

<sup>33</sup> Grid Resilience Order at P 12.

resource reforms.<sup>34</sup> The Commission’s resilience efforts included significant work to address bulk power system reliability through the North American Electric Reliability Corporation (“NERC”) reliability standards.<sup>35</sup> The Commission stated that NERC and regional entities tasked with mandatory reliability standards have a critical role in addressing resilience.<sup>36</sup> In her concurring statement to the Grid Resilience Order, Commissioner LaFleur stated that resilience is “unquestionably an element of reliability.”<sup>37</sup>

In Comments to the Grid Resilience proceeding in AD18-7-000/RM18-1-00, PJM explained that it already considers resilience factors because many resilience actions are “anchored in...the existing reliability standards.”<sup>38</sup> Yet, PJM asks the Commission to articulate that the regional planning responsibilities of RTOs, currently mandated in 18 CFR § 35.34(k)(7) and NERC Transmission Planning (“TPL”) standards, include an obligation to assess resilience.<sup>39</sup> PJM asks that the Commission initiate a rulemaking or other proceeding establishing the RTO’s role in resilience planning.<sup>40</sup> PJM recommends consideration of additional or new NERC standards for new and updated equipment that address resilience risks, substation design, coordinated physical attacks on the bulk electric grid, and weather events.<sup>41</sup>

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<sup>34</sup> *Id.* at P 12.

<sup>35</sup> *Id.* at P 12.

<sup>36</sup> *Id.* at P 19.

<sup>37</sup> *Id.*, LaFleur Concurring Statement at 1.

<sup>38</sup> PJM Comments, Docket No. AD18-7-000 at 4 (filed Mar. 9, 2018).

<sup>39</sup> *Id.* at 5-6.

<sup>40</sup> *Id.* at 5-6, 72-74. PJM does not provide an adequate level of detail on how it would plan for resilience if so assigned by the Commission. For example, PJM does not describe whether its assessments are, or would be, deterministic or probabilistic in nature, thereby providing little insight into PJM’s approach or confirmation that PJM could holistically plan for system resilience.

<sup>41</sup> *Id.* at 73.

Resilience is a critical part of reliability assessments; however, resilience is not a distinct and separate concept from reliability.<sup>42</sup> The Commission should not carve out resilience and treat it as a discrete characteristic of wholesale electricity markets. CAISO has explained that many reliability standards address, in some manner, resilience issues surrounding the bulk electric system's performance and ability to withstand or recover from disruptive events, including the capability to anticipate, absorb, adapt to, and/or rapidly recover from a disruptive event.<sup>43</sup> Resilience is embedded within independent reliability standards that are promulgated and enforced by NERC, the not-for-profit electric reliability organization that develops and enforces reliability standards and is subject to FERC's FPA Section 215 oversight.<sup>44</sup> NERC is well-positioned to provide intelligence, knowledge, metrics, and threat analyses to understand and mitigate high-impact, low-frequency events that test grid resilience.<sup>45</sup> MISO has indicated that NERC planning standards effectively support resilience.<sup>46</sup>

The initiative surrounding establishment of a Strategic Transformer Reserve highlights how resilience is embedded in existing NERC reliability standards. In a Strategic Transformer Reserve Report to Congress, DOE evaluated means to mitigate potential threats to the United

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<sup>42</sup> See CAISO Comments at 8-9; NYISO Comments at 3. NYISO explained that reliability and resilience "are not necessarily separate and distinct concepts in relation to the electric system." NYISO Comments at 3.

<sup>43</sup> CAISO Comments at 9.

<sup>44</sup> Section 215(b) of the FPA, 16 U.S.C. § 824o. CAISO explained that many local reliability standards of ISOs and RTOs achieve the general objectives of resilience. CAISO Comments at 9.

<sup>45</sup> See, e.g., NERC's State of Reliability 2017 Report (June 2017), available at [https://www.nerc.com/pa/RAPA/PA/Performance%20Analysis%20DL/SOR\\_2017\\_MASTER\\_20170613.pdf](https://www.nerc.com/pa/RAPA/PA/Performance%20Analysis%20DL/SOR_2017_MASTER_20170613.pdf); see also NERC, *Severe Impact Resilience: Considerations and Recommendations*, at 12 (Board Accepted May 9, 2012). Available at [https://www.nerc.com/comm/OC/SIRTF%20Related%20Files%20DL/SIRTF\\_Final\\_May\\_9\\_2012-Board\\_Accepted.pdf](https://www.nerc.com/comm/OC/SIRTF%20Related%20Files%20DL/SIRTF_Final_May_9_2012-Board_Accepted.pdf).

<sup>46</sup> See MISO Comments at 21.

States bulk electric power grid created by an inability to procure large power transformers during widespread outages associated with low-frequency, high-impact events.<sup>47</sup> DOE's Office of Electricity Delivery and Energy Reliability explained that DOE has recommended encouraging and supporting "an industry-based option driven by voluntary industry actions" and NERC Reliability Standard CIP-014-2 requirements.<sup>48</sup> The DOE Report emphasizes that the industry and utilities must be able to respond to adverse events to ensure the grid "is *increasingly resilient* and able to recover quickly from widespread transformer failures."<sup>49</sup> The DOE Transformer Report highlighted the numerous efforts by DOE's Office of Electricity and Energy Reliability over the past few years to improve transformer and grid resilience.<sup>50</sup>

The DOE Transformer Report treats resilience as an existing element of reliability and NERC Reliability Standards. The Commission approved NERC's Critical Infrastructure Protection ("CIP")-014-2 Reliability Standard on November 20, 2014. Standard CIP-014-2 requires utilities to create plans to protect transmission stations and substations and their associated primary control centers that, if damaged in a physical attack, could result in instability, uncontrolled separation, or cascading within an interconnection.<sup>51</sup> Standard CIP-014-2 requires transmission owners and operators to identify transmission stations/substations critical to grid

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<sup>47</sup>Strategic Transformer Reserve, DOE Report to Congress at ii (March 2017) (hereinafter "DOE Transformer Report"). Available at <https://www.energy.gov/sites/prod/files/2017/04/f34/Strategic%20Transformer%20Reserve%20Report%20-%20FINAL.pdf>.

<sup>48</sup>*Id.* at ii. The report explained that collaborative industry efforts include the sharing of transformers and other associated equipment in the event of a major disruption to the grid. *Id.* at 9.

<sup>49</sup> *Id.* at v (emphasis added).

<sup>50</sup> *See id.* at 13-16.

<sup>51</sup> *Id.* at 16-17; NERC Reliability Standard CIP-014-2 – Physical Security, available at <https://www.nerc.com/pa/Stand/Reliability%20Standards/CIP-014-2.pdf>.

stability and to evaluate the vulnerability of their facilities to physical attacks.<sup>52</sup> Standard CIP-014-2 Requirement 5 (“R5”) requires the implementation of a security plan designed to protect against attacks. R5 associates “resiliency” with security measures and explains that resiliency may include system topology changes, spare equipment, and construction of a new transmission station/substation.<sup>53</sup>

The DOE Transformer Report also explains that NERC Reliability Standard EOP-010-1 on Geomagnetic Disturbance (“GMD”) addresses severe storms and events like solar flares that can alter the electric currents in the earth’s magnetic field and thus impact reliability.<sup>54</sup> Emergency Preparedness and Operations (“EOP”) Standard EOP-010-1 requires reliability coordinators to develop and implement operating procedures and plans to mitigate potential impacts from a GMD event.<sup>55</sup> NERC Standard TPL-007-1, approved on September 22, 2016, established requirements for transmission system planned performance during GMD events.<sup>56</sup> Standard TPL-007-1 requires certain transmission and generator owners and transmission planners to assess the vulnerability of their system to a bench mark “one-in-100-year” GMD event.<sup>57</sup>

The DOE Transformer Report concluded that the aforementioned NERC Standards (CIP-014-2, EOP-010-1, and TPL-007-1), taken together, “could form the basis for improved

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<sup>52</sup> *Id.*

<sup>53</sup> NERC Reliability Standard CIP-014-2 – Physical Security at 6, 30.

<sup>54</sup> DOE Transformer Report at 17; NERC Reliability Standard EOP-010-1, available at <https://www.nerc.com/pa/Stand/Reliability%20Standards/EOP-010-1.pdf>.

<sup>55</sup> *Id.*

<sup>56</sup> *Id.* at 17; NERC Reliability Standard TPL-007-1, available at <https://www.nerc.com/pa/Stand/Reliability%20Standards/TPL-007-1.pdf>.

<sup>57</sup> *Id.*

substation resilience that would address a variety of threats.”<sup>58</sup> Instead of creating a new set of resilience standards, the Commission, as necessary and appropriate, may direct a process wherein NERC would update the relevant CIP/EOP/TPL standards to incorporate additional grid resilience attributes to prevent and mitigate both physical and cyber threats and attacks. NERC would then carefully consider and promulgate resilience/reliability standards that the Commission would consider for approval. Importantly, existing NERC standards address resilience, and compliance with NERC standards is subject to audits and enforcement.<sup>59</sup>

Neither PJM nor any other entity has demonstrated that there are immediate or imminent threats to reliability that warrant the creation of new and separate resilience standards at this time. In fact, PJM explains that the PJM Bulk Electric System is safe and reliable today because it has been designed and operated to meet all applicable reliability standards.<sup>60</sup> Recently, in a March 30, 2018 letter response to a request for an emergency order, PJM again affirmed: “PJM can state without reservation there is no immediate threat to system reliability.”<sup>61</sup> PJM does not contend there are safety and reliability issues in the PJM footprint. Accordingly, the development of any enhancements to existing NERC reliability/resilience standards should be allowed to progress at a considered pace; the Commission should not rush to judgment and disrupt both the PJM and NERC processes by super-imposing new resilience requirements.

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<sup>58</sup> *Id.* at 17.

<sup>59</sup> *See* MISO Comments at 46.

<sup>60</sup> PJM Comments, Docket No. AD18-7-000 at 4 (filed Mar. 9, 2018).

<sup>61</sup> PJM Letter to Secretary Perry re FES’s Request for Emergency Relief under Section 202 of the Federal Power Act at 1 (Mar. 30, 2018).



**D. The Commission Should Employ a Cost-Benefit Analysis or Prudence Assessment Regarding Any Additional Funding Efforts to Address Resilience.**

In its Comments, PJM asked the Commission to establish a process, either informally through one of its offices or formally through a filing process, by which an RTO could “receive verification as to the reasonableness of its assessments of vulnerabilities and threats, including Commission utilization of information that may be available to it, but not available to the RTO because of national security issues.”<sup>62</sup> PJM further explained that the Commission should use those verified assessments in coordination with other federal agencies (DOE, Homeland Security, Defense) and NERC.<sup>63</sup> PJM explained that the Commission needs to “provide intelligence and metrics to apply to resilience vulnerability and threat analyses that can then guide and anchor subsequent RTO planning, market design, and/or operations directives.”<sup>64</sup> Thus, PJM asks the Commission for more information sharing and coordination to address resilience. In asking the Commission to initiate a number of Commission initiatives and timelines to address and “fix” resilience issues,<sup>65</sup> PJM opens the door to additional regulatory proceedings and process layers to the PJM Tariff and the existing regulatory framework on reliability.<sup>66</sup>

Increased coordination and information sharing to address resilience is beneficial to all market participants. However, cost-effective steps should be taken when evaluating resilience-related information and requiring actions to address resilience. Before adding requirements and

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<sup>62</sup> PJM Comments at 5.

<sup>63</sup> *Id.* at 5.

<sup>64</sup> *Id.* at 5.

<sup>65</sup> *See id.* at 5-8.

<sup>66</sup> In contrast to PJM, MISO, in response to the Commission’s question regarding whether each RTO/ISO should be required to identify certain resilience needs, MISO affirmed: “MISO is already identifying resilience needs against contingencies that could result in the loss or unavailability of key infrastructure and systems.” MISO Comments at 20.

processes, the Commission should consider improving and enhancing existing requirements and processes. When adding specific criteria, metrics, standards, or resilience requirements to the existing reliability standards and regulatory framework, the Commission should consider a customer-centric, risk-based framework that accounts for the time-sensitive and probabilistic nature of identifiable disruptive events. The framework could deploy a time-series based simulation technique (Monte Carlo) with metrics and thresholds that allow for the utilization of historical TADS/GADS performance data correlated to geospatial events such as severe weather related outages.<sup>67</sup> The framework should also account for transmission asset-specific data such as age, condition, vegetation management, and asset maintenance records to ensure an appropriate and consistent representation of assets' current and projected outage rates and availability during these severe events. Any framework employed should also allow for the quantification of risks as projections will vary over time and across locations. Finally, the framework should be developed in coordination with Load Serving Entities to assign the appropriate weight to customer-centric information such as projected load loss (in MW), duration of load loss ("LOLH"), customers impacted, project customer minutes of interruption, and impacts to critical infrastructure load such as water treatment facilities.

With the establishment of an appropriate framework, regulators, planners, and stakeholders will be able to conduct cost-benefit analyses, prudence assessments, and/or evaluations of the ability of entities to finance any extensive resilience efforts.<sup>68</sup> For example, in the transmission

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<sup>67</sup> See NERC 2016 Probabilistic Assessment at 34-36 (March 2017), available at [https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/2016ProbA\\_Report\\_Final\\_March.pdf](https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/2016ProbA_Report_Final_March.pdf).

<sup>68</sup> See CAISO Comments at 8.

space, “resilience” has been a rallying cry for supplemental projects.<sup>69</sup> Such projects exist in an area with little opportunity for a prudence review. Absent clear standards and effective oversight, “resilience” can be invoked to justify irrational investment in multiple multi-million-dollar supplemental projects in order to increase shareholder profit. As many of the resilience initiatives are being reviewed in separate stakeholder work efforts, it is important that the efforts be also

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<sup>69</sup> For example, since 2017, transmission owners in PJM have been adding an undefined “resilience” category to their planning assumptions. PJM transmission owners have submitted numerous multi-million-dollar Supplemental Projects from 2017 to 2018 year to date. See <http://www.pjm.com/planning/rtep-upgrades-status/construct-status.aspx>. The 2017 plans of AEP, ComEd, DEOK, FirstEnergy, BGE, PECO, and PPL included resilience assumptions, but those companies did not include such resilience planning assumptions in their 2016 plans. See <http://www.pjm.com/-/media/committees-groups/committees/srtep-w/20170124/20170124-2017-aep-planning-assumptions.ashx>; <http://www.pjm.com/-/media/committees-groups/committees/srtep-w/20160204/20160204-aep-local-planning-assumptions.ashx>; <http://www.pjm.com/-/media/committees-groups/committees/srtep-w/20170124/20170124-2017-comed-planning-assumptions.ashx>; <http://www.pjm.com/-/media/committees-groups/committees/srtep-w/20160204/20160204-comed-local-planning-assumptions.ashx>; <http://www.pjm.com/-/media/committees-groups/committees/srtep-w/20170124/20170124-2017-deok-planning-assumptions.ashx>; <http://www.pjm.com/-/media/committees-groups/committees/srtep-w/20160204/20160204-comed-local-planning-assumptions.ashx>; <http://www.pjm.com/-/media/committees-groups/committees/srtep-w/20170124/20170124-2017-fe-west-planning-assumptions.ashx>; <http://www.pjm.com/-/media/committees-groups/committees/srtep-w/20170124/20170124-2017-fe-west-planning-assumptions.ashx>; <http://www.pjm.com/-/media/committees-groups/committees/srtep-ma/20170124/20170124-bge-planning-assumptions.ashx>; <http://www.pjm.com/-/media/committees-groups/committees/srtep-ma/20160204/20160204-2016-bge-rtep-planning-modeling-and-procedures.ashx>; <http://www.pjm.com/-/media/committees-groups/committees/srtep-ma/20170124/20170124-peco-planning-assumptions.ashx>; <http://www.pjm.com/-/media/committees-groups/committees/srtep-ma/20160204/20160204-2016-peco-local-criteria-assumptions.ashx>; <http://www.pjm.com/-/media/committees-groups/committees/srtep-ma/20170124/20170124-ppl-rtep-assumptions.ashx>; <http://www.pjm.com/-/media/committees-groups/committees/srtep-ma/20160204/20160204-ppl-sub-regional-rtep-assumptions.ashx>. PSE&G did not add resilience assumptions until 2018. See <http://www.pjm.com/-/media/committees-groups/committees/srtep-ma/20170124/20170124-pseg-to-planning-criteria-overview.ashx>; <http://www.pjm.com/-/media/committees-groups/committees/srtep-ma/20180126/20180126-pseg-2018-planning-assumptions.ashx>.

considered in their totality to avoid costly overlap that yields little additional benefit. Accordingly, resilience-related information should be evaluated prudently and cost-effectively—and on a comprehensive basis—before costly, unnecessary steps are undertaken. The cost impact and cost consequences of resilience initiatives should not be disregarded.

Because efforts to improve resilience and minimize the likelihood of disruptive events could require the expenditure of substantial funds and resources, the Commission should review requests for cost recovery to determine if the costs to address and improve resilience are prudently incurred, fair, and cost-effective.<sup>70</sup> The degree of pre-event, precautionary resilience efforts to be undertaken by RTOs/ISOs and other appropriate entities should be linked to the probability of a particular event.<sup>71</sup> Quantifying risks and benefits may be difficult and will differ by region.<sup>72</sup> If intelligence suggests an actionable, disruptive event is imminent, then RTOs/ISOs, utilities, and government agencies should be afforded more significant flexibility to expeditiously address that severe threat/event.<sup>73</sup>

**E. The Commission Should Encourage More Vetting in the Stakeholder Process Regarding the Valuation of Resilience in Transmission Planning Before Requiring Any RTO/ISO Filing Implementing Resilience Planning Criteria.**

In its Comments, PJM asked the Commission to articulate that the regional planning responsibilities of RTOs includes an obligation to assess resilience.<sup>74</sup> PJM also asked the

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<sup>70</sup> See CAISO Comments at 8; see also MISO Comments at 7 (recommending a stakeholder process to evaluate the costs and benefits of resilience projects).

<sup>71</sup> See ERCOT Comments at 3-4 (explaining that “the ultimate goal of policymakers should be to ensure that *all* foreseeable threats to the reliability of the bulk-power system are identified and addressed in the most cost-effective way”).

<sup>72</sup> See MISO Comments at 20.

<sup>73</sup> See *id.* at 10, 20.

<sup>74</sup> PJM Comments at 5-6, 81-82.

Commission to initiate rulemakings regarding an RTO's role in resilience planning.<sup>75</sup> PJM further asked the Commission to reconcile the open access and transparency mandates in FERC Order Nos. 890 and 1000 with the challenges of public disclosure of grid resilience vulnerabilities to ensure that grid vulnerabilities are not exploited by those with bad intent.<sup>76</sup>

Before adding resilience requirements to transmission planning processes, the Commission should consider improving and enhancing existing requirements and processes. As indicated earlier in Section III.C. of these Comments, the Commission need not create a new set of resilience standards, but the Commission could direct a process wherein NERC would update the relevant CIP/EOP/TPL standards, as necessary, to ensure grid resilience to prevent and mitigate both physical and cyber threats and attacks.

As to the public disclosure of grid vulnerabilities, the Commission should consider reevaluating and/or clarifying its standards governing Critical Energy Infrastructure Information ("CEII"). The Commission has explained that CEII relates to critical electric infrastructure and that the Commission has procedures in place that would allow access to CEII outside of a Freedom of Information Act request.<sup>77</sup> However, the type of data or information that constitutes CEII is not always clear and may receive different treatment by utilities and interested parties in different settings. Therefore, the Commission, after receiving input from stakeholders, should consider clarifying and specifying CEII standards.

PJM asks the Commission to initiate a number of Commission initiatives and timelines to address and "fix" resilience issues, including: (1) a formal or informal process that would allow

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<sup>75</sup> *Id.* at 5-6, 81-82.

<sup>76</sup> *Id.* at 5-6, 81-82.

<sup>77</sup> See Critical Energy/Electric Infrastructure Information (CEII), available at <https://www.ferc.gov/legal//maj-ord-reg/land-docs/ceii-rule.asp> (last accessed Apr. 11, 2018).

an RTO to receive verification as to the reasonableness of its assessments of vulnerabilities and threats; (2) rulemakings or other proceedings to further articulate the RTO role in resilience planning; and (3) a required RTO/ISO filing that proposes necessary tariff amendments to implement resilience criteria.<sup>78</sup> In contrast to those formal initiatives and deadlines, MISO, in its Comments, encouraged opportunities for industry engagement regarding the incorporation and valuing of resilience in the transmission planning process.<sup>79</sup> MISO explained that a stakeholder process would allow beneficial dialogue and evaluation on the costs and benefits for projects with significant resilience benefits.<sup>80</sup> Consistent with MISO’s Comments, the Commission should encourage more vetting in the stakeholder process and industry discussion, through the NERC standards-setting process and otherwise, regarding the valuation of resilience in transmission planning processes before any Commission requirement of RTO/ISO implementation of resilience planning criteria and other formal proceedings.

**F. The 2014 Polar Vortex and the 2017-2018 Cold Snap/“Bomb Cyclone” Weather Events Do Not Justify Subsidizing Uneconomic Coal and Nuclear Units in PJM in the Name of Resilience.**

The Proposed Rule on resilience by the DOE, which the Commission rejected in the Grid Resilience Order, had sought to require RTOs and ISOs to establish a tariff mechanism providing for the purchase of energy from an eligible resilient/reliable resource and a “resilience rate” that would allow recovery of costs and a return on equity for those eligible resources.<sup>81</sup> As the basis for that tariff mechanism, the Proposed Rule cited to the retirements of baseload generation from

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<sup>78</sup> PJM Comments at 5-6.

<sup>79</sup> MISO Comments at 7.

<sup>80</sup> *Id.* at 7.

<sup>81</sup> Grid Resilience Order at ¶ 2.

coal and nuclear, the problems exposed by the Polar Vortex, and the generalized need for organized markets to compensate resources for their resilience attributes.<sup>82</sup>

In the Grid Resilience Order, the Commission noted comments by RTOs/ISOs indicating that retirements did not threaten grid resilience and that assertions of resiliency/reliability issues due to potential retirements of particular resources did not demonstrate the unjustness or unreasonableness of existing RTO/ISO tariffs.<sup>83</sup> Nonetheless, certain stakeholders continue advancing arguments regarding the resiliency of coal and nuclear baseload resources that the Commission affirmatively rejected in the Grid Resilience Order. On March 29, 2018, FirstEnergy Solutions Corp. (“FES”) submitted a Request for Emergency Order Pursuant to Federal Power Act Section 202(c)<sup>84</sup> to the Secretary of DOE, broadly requesting a bailout for nuclear and coal generation in PJM.

Importantly, in its Comments at this docket, PJM explains that it has made numerous recommendations and learned many lessons from certain recent high-impact, low frequency events such as the 2014 Polar Vortex and the 2017-2018 Cold Snap (also known as the “Bomb Cyclone”).<sup>85</sup> These kinds of weather events and aberrations do not justify subsidizing uneconomic coal and nuclear units in PJM in the name of resilience.

### **1. The 2017-2018 Cold Snap / Bomb Cyclone**

In its emergency order request, FES cited in support a March 13, 2018 DOE-sponsored National Energy Technology Laboratory report (“NETL Report”) to evaluate the contributions of

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<sup>82</sup> *Id.* at ¶ 3.

<sup>83</sup> *Id.* at ¶ 15.

<sup>84</sup> 16 U.S.C. § 824a(c).

<sup>85</sup> *See* PJM Comments at 53-54.

coal-fired generating units in PJM during the “Bomb Cyclone” winter weather events in late December 2017 to early January 2018.<sup>86</sup> The NETL Report states that some coal-fired generating units were a prominent example of “resilience in action” in PJM during the Bomb Cyclone.<sup>87</sup> However, the NETL Report’s conclusion about the resiliency of existing coal units in PJM is based on a limited comparison between the increase in coal generation during the Bomb Cyclone and the level of generation from December 1 through 26, 2017 from other resources.<sup>88</sup> In a recent response to the NETL Report, PJM disagreed with the NETL Report’s overall conclusion and explained that PJM dispatched coal units because their costs were lower during certain periods of the Cold Snap and that natural gas or nuclear units were not unreliable or otherwise unavailable to serve the increased customer demand.<sup>89</sup> Therefore, PJM concluded that “the NETL report, as it relates to PJM, reaches some sweeping conclusions that are not supported by the specific facts concerning grid operations during Dec. 27, 2017–Jan. 7, 2018.”<sup>90</sup>

Critically, the NETL Report does not show that “immediate action” by DOE is necessary to prop up uneconomic coal and nuclear units. Prior to the Bomb Cyclone, many coal generation units were idle or only partially utilized because they were uneconomic and too costly to operate.

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<sup>86</sup> See FES Request at 4-9 (citing National Energy Technology Laboratory, Reliability, Resilience, and the Coming Wave of Retiring Baseload Units Volume I: The Critical Role of Thermal Units During Extreme Weather Events (Mar. 13, 2018) (“NETL Report”), available at <https://www.netl.doe.gov/research/energy-analysis/search-publications/vuedetails?id=2594>).

<sup>87</sup> NETL Report at 12.

<sup>88</sup> See *id.* at 12. Importantly, the NETL Report includes an upfront disclaimer indicating that it only represents “the views and opinions of authors” that “do not necessarily state or reflect those of the United States Government or any agency thereof.” *Id.* at Disclaimer page.

<sup>89</sup> Perspective and Response of PJM Interconnection to National Energy Laboratories Report Issued March 13, 2019 at 1 (2018 by PJM), available at <http://www.pjm.com/-/media/library/reports-notice/weather-related/20180413-pjm-response-to-netl-report.ashx?la=en> (hereinafter “PJM Response to NETL Report”).

<sup>90</sup> *Id.* at 1.



The increase in coal generation during the Bomb Cyclone shows only that those coal generators are uncompetitive unless electricity and gas prices increase significantly. Instead of measuring resilience in PJM, the NETL Report “simply finds which energy sources are the most expensive.”<sup>91</sup> The NETL Report shows that coal is expensive, rather than “resilient,” and “one cannot extrapolate from these economic facts a conclusion as to future reliability within PJM.”<sup>92</sup> Thus, any reliance on the NETL Report’s cursory assessment that many coal units in PJM are expensive fails to support claims that those units are critically needed to meet demand or ensure resiliency or reliability.

Essentially, the NETL Report provides an assessment of the present supply curve in PJM and highlights that as load increases, RTOs move up the supply stack and increasingly commit higher cost, lower efficiency units.<sup>93</sup> The NETL Report appears to misconstrue typical generation operation of coming on-line when market forces are such that the price being paid for electricity is greater than the cost for the unit to produce electricity as somehow equating to a herculean effort at providing grid resilience.<sup>94</sup> Such an assessment ignores the fact that in most cases, the generation coming on-line is receiving a capacity market payment collected from consumers to provide standby service and be ready to provide output when demand or prices are high. While it is gratifying that units residing in the portion of the supply stack that were called upon operated as

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<sup>91</sup> Michael Goggin, Fossil Lab Misses Mark in Cold Weather “Resilience” Report, (Mar. 28, 2018), available at <http://sustainableferc.org/fossil-lab-misses-mark-in-cold-weather-resilience-report/>; see also PJM Response to NETL Report at 1-2. PJM explained that, during the Cold Snap, “the region experienced an increase in the price of natural gas, which made coal resources (which often did not run under periods of lower natural gas prices) the more economic choice during times of high gas prices. **But one cannot extrapolate from these economic facts a conclusion as to future reliability within PJM.**” *Id.* at 1 (emphasis added).

<sup>92</sup> PJM Response to NETL Report at 1.

<sup>93</sup> See NETL Report at 12-18.

<sup>94</sup> See PJM Response to NETL Report at 2.

they were obligated to do, it is no less important to recognize that there likely remained higher priced units in the supply stack that were not required to operate during the Bomb Cyclone, but nonetheless received a capacity payment for the standby service that was provided.<sup>95</sup>

Reliance on an assessment of resilience simply based on a cursory review of increased generation output overlooks other data points that qualify the increased output. As PJM has noted, 28% of combined coal and oil units with on-site fuel inventories reported issues with fuel resupply due to fuel transportation constraints, with coal units most frequently reporting delays due to frozen rivers and increased barge traffic.<sup>96</sup>

Additionally, as it relates to PJM, the NETL Report seems to value the inability of coal plants to cycle during lower priced overnight hours or lower load days of the Bomb Cyclone and equates this inflexibility to increased resilience contribution. NETL correctly identified cycling of natural gas units during the Bomb Cyclone but failed to acknowledge that the flexibility afforded by units that can cycle over holidays, lower load weekend periods, and overnight hours is a desirable characteristic that results in more efficient power market operations.<sup>97</sup> In fact, based on the average daily generation output metric that is used in NETL to purportedly assess plant performance and resilience contribution value, this metric is likely skewed significantly due to desired cycling of the natural gas and oil units, and its value as a meaningful metric is problematic.

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<sup>95</sup> See *id.* at 3, 7-8 (explaining that the NETL Report did not identify the level of system reserves and capacity available to operators during the Cold Snap). PJM further explained that the PJM system had 32,645 MW (or 23%) of additional capacity available to serve demand during the peak demand of the Bomb Cyclone period. *Id.*

<sup>96</sup> PJM Interconnection, PJM Cold Snap Performance Dec. 28, 2017, to Jan. 7, 2018 (Feb. 26, 2018) at 16, available at <http://www.pjm.com/-/media/library/reports-notice/weather-related/20180226-january-2018-cold-weather-event-report.ashx>.

<sup>97</sup> See NETL Report at 15 (“wide swings in hourly output of up to 4 GW imply that increment was met by cycling natural gas combined cycle units”).

PJM is and has been effectively ensuring system reliability and resilience during a time of shifting energy and generation resources. During the Bomb Cyclone, PJM explained that “the grid and the generation fleet performed well” and that “[e]ven during peak demand, PJM had excess reserves and capacity.”<sup>98</sup> The NETL Report does not demonstrate that, after the retirement of certain coal units, PJM will be unable to procure sufficient generation capacity to meet its reserve margin requirement from new or existing resources. Importantly, the NETL Report does not measure resiliency and does not constitute a formal and thorough determination on resiliency.

## 2. The 2014 Polar Vortex

FES and DOE’s Proposed Rule cited the 2014 Polar Vortex (and associated cold weather spikes) as justification for providing out-of-market subsidies to ensure the continued operation of certain existing nuclear and coal generation facilities.<sup>99</sup> The two regions most directly impacted by the 2014 Polar Vortex have already undertaken detailed reviews and have implemented market rule changes to forestall a repeat performance of the operational issues that challenged grid performance in 2014.<sup>100</sup> PJM has implemented numerous changes to its market rules that include

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<sup>98</sup> PJM Interconnection, PJM Cold Snap Performance Dec. 28, 2017, to Jan. 7, 2018 (Feb. 26, 2018), available at <http://www.pjm.com/-/media/library/reports-notice/weather-related/20180226-january-2018-cold-weather-event-report.ashx>.

<sup>99</sup> Grid Resilience Order at ¶ 3; FES Request at 5, 9, 17.

<sup>100</sup> The 2014 Polar Vortex and earlier severe winter weather conditions did, however, highlight operational issues that contributed to the forced outages and poor performance and compelled examination of the underlying causes and remedies. The regions most affected—PJM and ISO-NE—undertook detailed reviews to rectify those issues. PJM and ISO-NE each found that most, if not all, of the operational issues could be addressed if generation suppliers made investments in weatherization or increased operating budgets and commitments for future fuel deliveries. Both regions proposed (and the Commission generally accepted) market solutions that: (1) pay generation resources for better performance and allow recovery of investment in operational reliability of the resource, including forward fuel costs; and (2) impose a strong monetary penalty for poor performance—with limited to no exceptions. Comments of the ISO/RTO Council at 21, *Grid Reliability and Resilience Pricing*, Docket No. RM18-1-000 (Oct. 23, 2017) (“ISO/RTO Council Comments”).

its Capacity Performance construct and changing the timing of its day-ahead scheduling deadlines to provide gas-fired generators a better ability to submit timely pipeline nominations.<sup>101</sup> ISO New England has also implemented market rule changes that include its forward capacity market pay-for-performance rules.<sup>102</sup> Even regions not directly stressed by the 2014 Polar Vortex have used it as a “lessons learned” experience and have taken steps to improve market functionality. For example, New York ISO has initiated changes to its shortage pricing rules and improved operational monitoring on fuel availability.<sup>103</sup> MISO has implemented over 20 specific steps to reduce risks associated with grid operation during extreme weather events.<sup>104</sup>

Even though not all of the market rule changes have been implemented, the changes implemented prior to the winter of 2015 have already demonstrated a marked improvement in system performance. The winter of 2015 was remarkably similar to weather in 2014 as described by PJM:

The winter of 2015 was marked by cold temperatures similar to the winter of 2014—with the coldest temperatures experienced during February 2015 throughout the entire PJM footprint. Numerous cities across PJM hit their daily low-temperature records during February 2015. Due to the low temperatures and associated high electricity demand for heating needs, PJM set a new wintertime peak demand record of 143,086 megawatts the morning of Feb. 20 (hour ending 0800). The new peak record surpassed the previous all-time winter peak of 142,863 MW set Jan. 7, 2014. Some of the individual transmission zones within the PJM footprint also set all-time record winter peaks.

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<sup>101</sup> PJM Comments at 20-21, 36-37; *see also* PJM Comments in Docket No. RM18-1-00, Appendix A at 3-7, *Grid Reliability and Resilience Pricing*, Docket No. RM18-1-000.

<sup>102</sup> Comments of ISO New England Inc. at 11, *Grid Reliability and Resilience Pricing*, Docket No. RM18-1-000 (Oct. 23, 2017).

<sup>103</sup> Comments of the New York Independent System Operator, Inc., Attachment at 5, *Grid Reliability and Resilience Pricing*, Docket No. RM18-1-000 (Oct. 23, 2017).

<sup>104</sup> MISO Comments, Attachment A at 20, *Grid Reliability and Resilience Pricing*, Docket No. RM18-1-000.

In addition to the extremely cold temperatures, PJM also reviewed effective temperatures or wind chill data, for select cities throughout the footprint for both 2014 and 2015. This analysis indicated January 2014 actually felt colder just about everywhere when compared to 2015, especially in Columbus, Cleveland and Chicago, where effective temperatures were between 14 and 16 degrees warmer in 2015. The significant wind chill experienced during 2014 could have contributed to the higher amount of generator forced outages encountered in 2014. By comparison, the less severe warmer effective temperature, wind chill, in 2015 may have contributed to improved generator performance.<sup>105</sup>

PJM reported improved system performance in 2015, notwithstanding the fact that certain market rule changes, such as its Capacity Performance rules, had not yet been implemented:

Generator performance in February 2015 showed improvement, with forced outage rates better than in January 2014. For the morning of Feb. 20, 2015, when PJM reached a new all-time winter peak, the forced outage rate was 13.4 percent, representing 24,805 MW of generation forced out of service. Although the 2015 winter peak forced outage rates represent an improvement over the 22 percent forced outage rate during the Jan. 7, 2014, peak, the 2015 rates were still above historical “normal” winter peak outage rate of between 7 and 10 percent. The performance improvements of winter 2015 over 2014 are attributed to steps PJM and generation owners initiated after the winter of 2014 experience: pre-winter operational testing for dual-fuel and infrequently run units, a winter-preparation checklist program, better communication of fuel status and increased coordination with natural gas pipelines.

A total of 168 units (9,919 MW) participated in the pre-winter operational testing. Units that participated in the pre-winter operational testing had a lower rate of forced outages compared to those that did not test.<sup>106</sup>

Other RTOs/ISOs have also reported improved operational performance due to market rule changes that were implemented following the 2014 Polar Vortex.<sup>107</sup> Given the improved system performances resulting from the successful implementation of lessons learned from the 2014 Polar

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<sup>105</sup> PJM Interconnection, L.L.C., *2015 Winter Report* at 5 (May 13, 2015), available at <http://www.pjm.com/-/media/library/reports-notice/weather-related/20150513-2015-winter-report.ashx?la=en>.

<sup>106</sup> *Id.* at 5-6.

<sup>107</sup> ISO/RTO Council Comments at 21-22, *Grid Reliability and Resilience Pricing*, Docket No. RM18-1-000.

Vortex, the invocation of cold weather occurrences during the 2014 Polar Vortex does not provide an evidentiary basis for out-of-market subsidies—under the guise of “resilience” or otherwise—to prolong the continued operation of certain coal-fired and nuclear generating facilities. In its recent response to the NETL Report, PJM explained that its overall forced outages during the peak demand of the Cold Snap were only about half of the number of forced outages during the Polar Vortex.<sup>108</sup>

Moreover, PJM continues to evaluate the evolving resource mix (*i.e.*, increased natural gas and renewables and decreased coal and nuclear) in the PJM footprint to ensure system reliability.<sup>109</sup> For example, on April 30, 2018, PJM announced a Grid Resilience Initiative that will immediately address and analyze longer-term fuel security vulnerabilities.<sup>110</sup> In a scoping document associated with the new initiative, Valuing Fuel Security, PJM explained that heavy reliance on one resource type, such as natural gas, raises longer-term questions and risks stemming from increased dependence on a single fuel-delivery system.<sup>111</sup> In that scoping document, PJM outlined a market-based approach to assist in valuing the benefits of various alternatives, such as new pipelines, on-site fuel, and new technologies that promote different fuel-secure resources.<sup>112</sup> At this very early

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<sup>108</sup> PJM Response to NETL Report at 6.

<sup>109</sup> PJM’s Evolving Resource Mix and System Reliability (Mar. 30, 2017), *available at* <http://www.pjm.com/~media/library/reports-notice/special-reports/20170330-pjms-evolving-resource-mix-and-system-reliability.ashx> (last accessed Apr. 13, 2018).

<sup>110</sup> PJM Announces Next Phase of Grid Resilience Initiative (April 30, 2018), *available at* <http://insidelines.pjm.com/pjm-announces-next-phase-of-grid-resilience-initiative/>.

<sup>111</sup> Valuing Fuel Security at 1 (2018), *available at* <http://www.pjm.com/~media/library/reports-notice/special-reports/2018/20180430-valuing-fuel-security.ashx>.

<sup>112</sup> *Id.*

stage of the stakeholder review, the PJM Consumer Representatives take no position on the merits of the PJM's concept but plan to be actively involved in the stakeholder consideration.

**G. This Proceeding on Resilience Should Not Encompass Any Evaluation of PJM Market Reforms, As Such Reforms Are Currently Being Evaluated in Other Stakeholder Processes and Commission Proceedings.**

In its Comments, PJM asks the Commission to require PJM and all RTOs/ISOs to submit a filing proposing market reforms and compensation mechanisms to address resilience concerns within 9-12 months from the issuance of a final order in this proceeding.<sup>113</sup> The PJM Consumer Representatives have two fundamental concerns with PJM's suggestion.

Any perceived need for market reforms, compensation mechanism changes, and price formation initiatives require lengthy stakeholder discussion and debate.<sup>114</sup> Other RTOs/ISOs likely requested time and flexibility for their own stakeholder processes rather than arbitrary deadlines.<sup>115</sup> Moreover, the PJM stakeholder process on energy price formation issues is ongoing and underway. PJM and its stakeholders have already been evaluating and advancing potential reforms and solutions that support reliability and resilience, including 1) improvements to Operating Reserve market rules and shortage pricing, 2) improvements to Black Start requirements, 3) improvements to energy price formation, and 4) integration of distributed energy

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<sup>113</sup> PJM Comments at 6, 65-66.

<sup>114</sup> For example, MISO stakeholders considered Extended LMP for at least five years before it was implemented in March 2015. *See* Midcontinent Independent System Operator, Inc., *ELMP Parallel Operational Analysis* (June 2014), available at <https://cdn.misoenergy.org/20140603%20MSC%20Item%2005e%20ELMP%20Parallel%20Operation%20Analysis73949.pdf>.

<sup>115</sup> For example, ISO-NE asks for time and flexibility to develop solutions. ISO-NE Comments at 12. Similarly, NYISO asks for time to work with stakeholders as well as the possibility of technical conferences conducted by the Commission. NYISO Comments at 5. On May 8, 2018, CAISO, ISO-NE, MISO, NY-ISO, and SPP filed Joint Comments asking the Commission not to impose the actions or deadlines identified in PJM's comments on all RTOs/ISOs. Joint RTO/ISO Comments, Docket No. AD18-700 (filed May 8, 2018).

resources, storage, and emerging technologies.<sup>116</sup> Recently, PJM filed with the Commission two proposals to address the intersection of state public policy support for certain resources and/or technologies and the PJM capacity construct.<sup>117</sup> These kinds of market reforms and compensation mechanisms should be evaluated separate and apart from the broader resilience and system security issues implicated in this proceeding.

Arbitrary deadlines that imply a sense of urgency, if not inevitability, to market rule changes in the name of resiliency do a disservice to the PJM stakeholder process and PJM consumers. While the PJM Consumer Representatives generally support imposing reasonable timelines to review market rule changes to provide some discipline to stakeholder reviews, such timelines should be in accord with the criticality and complexity of the issue. For example, seeking stakeholder review of market rule changes on the fundamentals of the Locational Marginal Price (“LMP”) algorithm, which has been a foundation for PJM markets for twenty years, is not a simple exercise and has far-reaching implications. Other markets reviewing extended LMP, for example, conducted such a review over a period of years. Moreover, no market participant has raised a Problem Statement under PJM’s Manual 34 governing PJM’s stakeholder process that suggests stakeholders should work on these issues. A comparatively low bar exists for approval of such Problem Statements, which would trigger a stakeholder process. PJM’s current stakeholder process on energy price formation was brought by PJM in response to PJM’s Whitepaper on energy price formation.

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<sup>116</sup> PJM Comments at 6.

<sup>117</sup> See *PJM Interconnection, L.L.C.*, Capacity Repricing or in the Alternative MOPR-Ex Proposal: Tariff Revisions to Address Impacts of State Public Policies on the PJM Capacity Market, Docket No. ER18-1314-000 (filed Apr. 9, 2018).



Recently, PJM's CEO issued a letter to PJM stakeholders regarding the potential for improvement in PJM's energy market price formation construct.<sup>118</sup> In the letter, PJM expressed a belief that the longstanding LMP calculation can be improved but recognized that any changes to the LMP calculation will raise many stakeholder questions and require careful consideration.<sup>119</sup> Given that the fast-start pricing / convex hull pricing docket (EL18-34-000) is currently awaiting Commission action, PJM's Board believes PJM and stakeholders should continue working on implementing fast-start pricing details in the near-term as Docket EL18-34-000 moves toward resolution.<sup>120</sup> In the letter, PJM recognized that stakeholders are currently addressing many complex issues, but indicated that PJM and stakeholders may be able to soon reach consensus on the more targeted issue of reserve procurement and shortage pricing practices.<sup>121</sup> Therefore, the PJM Board requested stakeholders to prioritize developing details of market rule changes to address reserve procurement and shortage pricing issues so that PJM may file a Section 205 proposal to implement those changes in time for the winter of 2018/2019.<sup>122</sup>

In its Comments on Grid Resilience, PJM insinuates that stakeholders lack focus without deadlines<sup>123</sup> or may even be incapable of reaching solutions without deadlines.<sup>124</sup> This is simply not true. Imposing arbitrary deadlines could undermine the effectiveness of the stakeholder

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<sup>118</sup> April 11, 2018 PJM CEO Andrew L. Ott Letter to PJM Stakeholders, *available at* <http://www.pjm.com/-/media/committees-groups/task-forces/epfstf/postings/20180412-pjm-board-letter-regarding-energy-market-price-formation.ashx?la=en>.

<sup>119</sup> *Id.* at 1.

<sup>120</sup> *Id.*

<sup>121</sup> *Id.* at 1-2.

<sup>122</sup> *Id.* at 2.

<sup>123</sup> *See* PJM Comments at 66.

<sup>124</sup> *Id.* at 37-38.

process, which requires time to allow for consensus-based solutions and the opportunity to reach a superior result (as opposed to the product of a unilateral filing). The Commission has long held that there is value in stakeholder engagement and consensus-based solutions.<sup>125</sup> As noted above, many of the initiatives for which PJM sought deadlines are already in process. Those stakeholder processes should be allowed to proceed and any new proposals for market reforms and compensation mechanisms to address resilience concerns should utilize the stakeholder process outside of this proceeding and without looming arbitrary deadlines.

**H. Any PJM Authority to Deploy Non-Market Operations Must Be Subject to Clear, Objective, Transparent, and Auditable Emergency Conditions and Actions that Trigger and Control Such Non-Market Operations.**

PJM asks the Commission to require ISOs/RTOs to submit a filing with any necessary Tariff revisions that would permit non-market operations during emergencies, extended periods of degraded operations, or unanticipated restoration scenarios.<sup>126</sup> Importantly, PJM should only be permitted to engage in non-market operations during severe emergencies and threats to the grid. PJM should not be afforded unconstrained and unilateral operational discretion. Any ability to deploy non-market operations during a resilience-related emergency, as PJM requests, must be subject to clear, objective, transparent, and auditable conditions and actions that trigger and control such non-market operations. Thus, the Commission should establish clear, objective, transparent, and auditable emergency conditions under which PJM may engage in such non-market operations.

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<sup>125</sup> See *PJM Interconnection, LLC*, 157 FERC ¶ 61229, P11 (2016) [“[S]takeholder input is an essential element of a just and reasonable regional transmission planning process.”]

<sup>126</sup> PJM Comments at 6, 39-40, 65-66.

**1. More Stakeholder Vetting Is Needed to Evaluate Applicability of Proposed Market Power Mitigation Rules to Emergency Situations.**

During an emergency, when PJM deploys non-market operations, resources may price gouge and unreasonably exercise market power. The PJM Independent Market Monitor (“IMM”) has explained that “aggregate market power remains an issue when market conditions are tight” and that “market design choices must account for the potential to exercise aggregate market power.”<sup>127</sup> Therefore, because the existing market power mitigation measures do not address aggregate market power, the PJM IMM is developing an aggregate market power test and will propose the necessary market power mitigation rules to address aggregate market power.<sup>128</sup> The Commission, PJM, and the IMM should continue to evaluate aggregate market power and the need to develop the necessary market power mitigation standards and rules. Before allowing PJM to enjoy robust discretion to deploy non-market operations during an emergency, however, stakeholders should have an opportunity to evaluate the IMM’s proposed market power mitigation rules and the applicability of those rules to emergency situations.

**2. If Reliability Concerns Were To Arise Due to Generation Unit Retirements, PJM Has in Place Adequate Processes for Addressing Those Concerns.**

PJM currently has in place adequate processes to incorporate non-market operations in a way that is minimally disruptive to the market while ensuring reliability. PJM’s generation deactivation process adequately evaluates all generation retirements for an adverse impact on reliability. PJM’s Open Access Transmission Tariff and PJM Manual 14D prescribe a detailed

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<sup>127</sup> 2017 State of the Market Report for PJM, Volume 1 at 6 (Mar. 8, 2018), *available at* [http://www.monitoringanalytics.com/reports/PJM\\_State\\_of\\_the\\_Market/2017/2017-som-pjm-volume1.pdf](http://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2017/2017-som-pjm-volume1.pdf).

<sup>128</sup> *Id.*, Volume 2 at 27, 102 (Mar. 8, 2018), *available at* [http://www.monitoringanalytics.com/reports/PJM\\_State\\_of\\_the\\_Market/2017/2017-som-pjm-volume2.pdf](http://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2017/2017-som-pjm-volume2.pdf).

process that PJM must follow when a generation retirement is announced. After such an announcement, a timetable begins in which PJM initiates an analysis and explores transmission solutions to enable power to continue to reliably flow to customers.<sup>129</sup> Generator retirements are also included in PJM's Regional Transmission Expansion Planning process. PJM utilizes criteria to identify potential transmission system problems due to specific retiring. PJM may order transmission upgrades to keep the grid reliable in response to generator retirements.

PJM has in place Tariff provisions that provide adequate compensation for units that are determined to be Reliability Must Run ("RMR") units. Attachment K Appendix Section 6 of the PJM Tariff is entitled "Must-Run For Reliability Generation" and addresses PJM's RMR process, which provides PJM with the ability to keep essential assets online.<sup>130</sup> The RMR process is described in greater detail in Section 9.2 of PJM Manual 14D.

Under PJM Manual 14D, PJM may request a generating unit to operate past its desired deactivation date. Upon this notice, the generator may file with FERC for full cost recovery; alternatively, the generator owner may elect to receive avoidable cost compensation as per Part V of the PJM Tariff.<sup>131</sup>

PJM has used the RMR process infrequently, indicating that generation needed for reliability or "resilience" is not retiring and certainly not retiring prematurely.<sup>132</sup> However, these

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<sup>129</sup> See PJM Manual 14D: Generator Operational Requirements § 9.1. See also <http://learn.pjm.com/three-priorities/planning-for-the-future/explaining-power-plant-retirements.aspx>.

<sup>130</sup> PJM Tariff, Attachment K, Section 6.

<sup>131</sup> PJM Manual 14D § 9.2.

<sup>132</sup> American Manufacturers Comments at 34-39, Docket No. RM18-1-000.

processes provide PJM the tools to make it economic to keep generators online when necessary for grid reliability.

**I. Any Additional Steps on Gas-Electric Coordination Should Narrowly Focus on Prudent Efforts to Ensure Reliability and Resilience.**

**1. Improved communication and coordination between RTOs and pipelines can benefit reliability and resilience**

In its Comments, PJM asked the Commission to launch additional initiatives to improve coordination and communication between RTOs and interstate natural gas pipelines.<sup>133</sup> Progress on gas-electric coordination issues has occurred through various FERC technical conferences,<sup>134</sup> leading to some reforms. PJM now asks the Commission to go further to enforce and add more reforms to Order No. 787 to avoid the variable levels of information-sharing provided by different natural gas pipelines to PJM.<sup>135</sup>

PJM notes that some pipelines do not share information with PJM, “even for reliability reasons without requiring a circuitous process of obtaining end use customer consent.”<sup>136</sup> Better communication and coordination between RTOs and interstate natural gas pipelines can benefit reliability and resilience. Pipelines should readily and efficiently share information that PJM needs to address gas pipeline reliability and resilience issues. The Commission should take the necessary steps to require that appropriate confidentiality and non-disclosure protections are in place between RTOs/ISOs and FERC-jurisdictional interstate natural gas pipelines to ensure a steady and open flow of operational information. The Commission could also consider similar arrangements

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<sup>133</sup> PJM Comments at 6-7, 26-27, 55-59.

<sup>134</sup> *See generally* FERC Docket Nos. AD12-12-000, AD17-12-000.

<sup>135</sup> *See* PJM Comments at 7, 26-28, 55-57.

<sup>136</sup> *Id.* at 27.

between RTOs/ISOs and other fuel supply delivery providers (*e.g.*, railroads, barges, trucks, petroleum products, and pipelines).

**2. The Commission should not impose a mandate on electric generators to procure firm capacity**

PJM also “urges” the Commission to encourage the development of additional pipeline services tailored to the flexibility needs of natural-gas fired generation.<sup>137</sup> There may be financial incentives for natural gas pipelines to construct new facilities if natural gas marketers and local distribution companies (“LDCs”) see opportunities to transport lower-cost natural gas to higher-cost markets. However, few natural gas electric generators have procured capacity on interstate pipelines. Critically, a mandate should not be imposed on electric generators to procure firm capacity. Imposing such a mandate could limit options and reduce incentives for a generator to seek other potentially more cost-effective alternatives and solutions (*e.g.*, developing diverse natural gas supply arrangements through natural gas marketers).

PJM asks the Commission to evaluate whether certain communication and coordination obligations should be imposed on LDCs that supply jurisdictional wholesale generation.<sup>138</sup> PJM explained that Commission should examine whether such cooperation and coordination requirements could be imposed on LDCs, if not directly then perhaps indirectly as shippers under Commission-jurisdictional tariffs.<sup>139</sup> Importantly, the Commission does not have jurisdiction over LDCs. Enhanced coordination and communication must occur at the State level where the State

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<sup>137</sup> *Id.* at 7, 57-59.

<sup>138</sup> *Id.* at 28, 57-59, 66.

<sup>139</sup> *See id.* at 28.

has regulatory authority over LDCs. The Commission could take the lead in further spearheading the dialogue on remaining gas-electric coordination issues.

**IV. CONCLUSION**

For the reasons set forth above, the PJM Consumer Representatives respectfully request that the Commission consider the Reply Comments herein.

Respectfully submitted,

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/s/ Robert A. Weishaar, Jr.

By \_\_\_\_\_

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Counsel to the PJM Industrial Customer Coalition  
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Representatives

Dated: May 9, 2018



## CERTIFICATE OF SERVICE

I hereby certify that I have this day served, via first-class mail, electronic transmission, or hand-delivery the foregoing upon each person designated on the official service list compiled by the Secretary in this proceeding.

Dated at Washington, DC this 9<sup>th</sup> day of May, 2018.

/s/ Robert A. Weishaar, Jr.

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