UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Grid Reliability and Resiliency Pricing	))))	**Docket No. RM18-1-000**

COMMENTS OF THE ENERGY STORAGE ASSOCIATION

Pursuant to the Federal Energy Regulatory Commission's ("FERC" or "Commission") October 2, 2017, Notice Inviting Comments,[1] the Energy Storage Association("ESA") submits the following comments in response to the Secretary of Energy's September 28, 2017, proposal of a rule for final action by the Commission ("DOE's proposed rule")[2] under section 403 of the Department of Energy Organization Act.[3] For the reasons described herein, the ESA recommends that FERC should not adopt the Department of Energy's ("DOE") proposed rule. Instead, ESA recommends that FERC work with the North American Electric Reliability Corporation ("NERC") and other stakeholders to first establish a framework for defining and measuring the grid's resilience. ESA recommends that, subsequent to that effort, FERC initiate a proceeding to identify and value the full range of electric system resilience attributes that are inadequately compensated or uncompensated, as well as technology-neutral approaches to compensating any desired resilience attributes.

I. COMMUNICATIONS

Andrew O. Kaplan
Pierce Atwood LLP
100 Summer Street, Suite 2250
Boston, MA 021.
Phone: 617-488-8104
akaplan@pierceatwood.com

[1] *Grid Reliability and Resilience Pricing*, Notice Inviting Comments (Oct. 2, 2017).
[2] 82 Fed. Reg. 46,940 (Oct. 10, 2017).
[3] 42 U.S.C. § 7173 (2012).

Jason Burwen
Policy and Advocacy Director
Energy Storage Association
1800 M Street, NW
Suite 400S
Washington, DC 20036
Phone: 202-580-6285
j.burwen@energystorage.org

II. ABOUT THE ENERGY STORAGE ASSOCIATION

Since its inception 27 years ago, ESA has promoted the development and commercialization of competitive and reliable energy storage delivery systems for use by electricity suppliers and their customers. ESA's membership comprises a diverse group of electric sector stakeholders, including utilities, independent power producers, manufacturers of advanced technologies -- such as batteries, flywheels, thermal energy storage, compressed air energy storage, supercapacitors, and other technologies -- component suppliers, and system integrators.

ESA's more than 150 member companies have expertise in transmission- and distribution-level grid operations relevant to energy storage, as well as firsthand knowledge of the regulatory challenges to financing and operating commercial energy storage facilities to realize full benefits to the bulk power system.

III. COMMENTS

A. ESA believes that DOE's proposed rule does not demonstrate that existing RTO/ISO tariffs are unjust and unreasonable, is not clearly specified, and has not afforded a comment period commensurate to the magnitude of market changes proposed.

ESA agrees with the comment of the Clean Energy Industries in the instant docket that DOE not only misidentifies the problems facing competitive wholesale markets and proposes the wrong solution, but that the DOE proposal fails to justify potential action under Section 206 of the Federal

Power Act.[4] Moreover, DOE's proposed rule leaves numerous critical details unspecified. In addition to providing an insufficient basis for determining how such a rule would be implemented, the lack of details may have severe unintended consequences if left to interpretation. ESA notes, for example, that electric storage technologies could be eligible for cost-of-service regulation when co-located and integrated with an existing generator with 90 days of onsite fuel. While perhaps an unintended benefit for the energy storage industry, DOE's proposed rule is unlikely to have contemplated this consequence, or many others. Hence, for that reason, ESA opposes DOE's proposed rule and cautions FERC that efforts to fill out such details should take place in a longer series of public comment opportunities with a variety of market participant perspectives represented, rather than by FERC alone in internal deliberations.

B. ESA submits that prices and other market mechanisms are the most just and efficient way to provide reliable electric service at low cost.

Organized wholesale markets are founded on the principle of providing just and reasonable rates by having all generators compete based on performance and price. While no market is perfect – and existing RTO/ISO markets undoubtedly need further evolution - broader system goals can all be met with market-based mechanisms available to all market participants on a competitive basis and without discrimination.

ESA strongly opposes DOE's proposal for full and permanent cost-of-service regulation for generators in RTOs/ISOs with capacity markets, as doing so would undermine a core rationale for wholesale markets while increasing costs of electric service. First, accurate signals for entry and exit are necessary for well-functioning and competitive markets. Over 50% of PJM's resource mix[5], 18%

[4] 16 U.S.C. §824e. The DOE NOPR was proposed by the Secretary under authority granted by Section 403 of the DOE Organization Act. That section does not establish any additional authority for FERC to take final regulatory action, and Section 206 remains the controlling authorizing language for FERC action. The DOE NOPR also references Section 205 of the Federal Power Act, but that section does not authorize FERC to direct the amendment of existing utility tariffs.

[5] *See* PJM Interconnection, L.L.C, *PJM's Evolving Resource Mix and System Reliability*, March 30, 2017, available at http://www.pjm.com/~/media/library/reports-notices/special-reports/20170330-pjms-evolving-resource-mix-and-system-reliability.ashx

of NYISO's resource mix,[6] and 17% of ISO-NE's installed resource mix[7] consists of coal and nuclear units, the apparent targets for cost-of-service regulation under DOE's proposed rule. By implementing cost-of-service regulation for these units, FERC would eliminate the signals for market entry/exit to a significant proportion of the market of generation capacity. In addition to displacing other units able to provide service at lower cost, cost-of-service regulation of this magnitude would undermine price formation across all market products—not just capacity markets, but also energy and ancillary services markets as well. Cost-of-service regulated generators could bid below cost at all intervals and, in some cases, potentially flood shallower ancillary services markets with low- or zero-priced bids, collapsing them entirely.

Second, cost-of-service regulation for eligible generators proposed by DOE will increase costs to consumers. The value of the fuel assurance resilience attributes provided by generators will likely be less than their cost of service less market revenues. A significant number of the generators that would provide 90 days of onsite fuel have operating costs higher than what could be paid back in revenues from electric services under current market conditions; other generators are able to provide those electric services more economically. The value of 90 days of onsite fuel supply has not been quantified. DOE cites only PJM's operations during the 2014 Polar Vortex and NERC's 2017 letter to DOE on the risk of fuel supply chain disruptions as the rationale for using a criterion of 90-day onsite fuel supply, but neither actually specify what value having 90-days of onsite fuel conveys . Nevertheless, even if quantified, such fuel assurance is unlikely to be greater than cost-of-service less market revenues, as grid operators like PJM have indicated no reliability concerns associated with market exit of such generators, and thus no significant value.[8] The result is additional cost to

[6] See NYISO, *Power Trends 2015: Rightsizing the Grid*, available at http://www.nyiso.com/public/webdocs/media_room/press_releases/2015/Child_PowerTrends_2015/ptrends2015_FINAL.pdf

[7] See "Resource Mix," ISO-NE website, accessed Oct 13, 2017, available at https://www.iso-ne.com/about/key-stats/resource-mix

[8] *PJM's Evolving Resource Mix and System Reliability*, at 5 and 33. According to this PJM study, even with the retirement of some coal and nuclear generation and other changes in the generation mix, PJM has found – based on actual data and analysis –

consumers, for no appreciable incremental benefit. Additionally, such a criterion creates a perverse incentive for generators to construct facilities and secure 90 days of onsite fuel supply precisely to attain cost-of-service regulation—further increasing costs to consumers.

Third, cost-of-service regulation for eligible generators proposed by DOE would shift the risk of bad economic decisions from market participants to FERC and the RTOs/ISOs. Without incentives to maintain competitiveness, cost-of-service regulated generators will face no market discipline to control costs effectively. At the same time, such a regimen will impose a significant administrative burden on FERC and the RTOs/ISOs, who will be tasked with determining appropriate compensation in the face of an inherent information asymmetry with the generators whose cost recovery they regulate. Doing so will increase costs of grid operations and governance.

Fourth, as every state utility commissioner is aware, the inherently limited administrative capacity to comprehensively and accurately audit generator costs and operations creates a tendency toward under-performance and/or over-compensation of generators—all of which increases costs to consumers.

C. ESA agrees with DOE's recommendation for improving price formation on reliability and resilience attributes of resources.

ESA agrees with the recent recommendations from DOE to improve price formation associated with reliability and resilience attributes of resources. For example, in its August 2017 *Staff Report on Electricity Markets and Reliability* ("DOE Staff Report"), DOE recommended improving valuation of and compensation for essential reliability services:[9]

---

footnote continued
that "[p]ortfolios composed of up to 86 percent natural-gas fired resources maintained operational reliability" and that "[m]ore diverse portfolios are not necessarily more reliable." PJM commits to an on-going review of these issues, both through reliability analyses and stakeholder engagement, to ensure a resilient and reliable grid through operational, market compensation, and regulatory options.

[9] *See* U.S. Department of Energy, *Staff Report to the Secretary on Electricity Markets and Reliability*, Aug 2017 ("DOE Staff Report") at 126.

> "Valuation of Essential Reliability Services (ERS): Where feasible and within its statutory authority, FERC should study and make recommendations regarding efforts to require valuation of new and existing ERS by creating fuel-neutral markets and/or regulatory mechanisms that compensate grid participants for services that are necessary to support reliable grid operations. Pricing mechanisms or regulations should be fuel and technology neutral and centered on the reliability services provided. DOE should provide technical and policy support that strengthen and accelerate these efforts."

DOE also recommended improving energy market price formation, such as PJM's proposals to assign prices to resource flexibility:

> "Wholesale Markets: FERC should expedite its efforts with states, RTO/ISOs, and other stakeholders to improve energy price formation in centrally-organized wholesale electricity markets. After several years of fact finding and technical conferences, the record now supports energy price formation reform, <u>such as the proposals laid out by PJM</u>." (emphasis added)

Aligned with DOE's recommendations, ESA urges FERC to consider means to value and compensate all inadequately compensated or uncompensated resilience attributes for their cost-effective provision. DOE has focused on only a single resilience attribute—fuel assurance—to the exclusion of others. The DOE Staff Report cites PJM to identify several other resilience attributes that are inadequately compensated or uncompensated:[10] essential reliability services like frequency response, voltage control, and ramp; flexibility attributes like short minimum run times and fast start; and other attributes, such as ability to run without environmental restrictions. Of the total 13 attributes listed, only two—regulation and contingency reserve—are directly compensated as priced market products, and a third—black start capability—is compensated through RTO/ISO procurement.

Electric storage resources can provide electric system reliability and resilience solutions that are inadequately compensated or uncompensated. Indeed, the DOE Staff Report acknowledges some

[10] DOE Staff Report at 86.

of these attributes of storage, both in essential reliability services and system flexibility. However, most of these attributes are not compensated directly or captured in market products. For example:

- Ramp services are uncompensated or incomplete in many RTOs/ISOs. For example, load-following products compensate flexible resources forced to ramp up or down uneconomically to meet demand when a larger, inflexible resource must operate at a minimum output level.[11] PJM's own description of a load-following product—which has not yet been proposed in PJM—states that it "would provide enhanced opportunities for flexible resources, including new technologies, such as energy storage resources, to receive compensation for the value of their flexibility."[12] (emphasis added) To meet system ramp needs, California ISO ("CAISO") and Midcontinent ISO ("MISO")[13] both have introduced ramp products, and New York ISO ("NYISO") and CAISO both have instituted multi-period dispatch,[14] with varying levels of success in providing ramp capability and avoiding uplift payments.[15] PJM and ISO New England ("ISO-NE") have no such mechanisms to value ramp.

- Frequency response is uncompensated in all RTOs/ISOs. Primary frequency response is the subject of a pending rule at FERC that, if finalized, would in fact undermine price formation.[16] PJM and CAISO have begun consideration of a PFR market product, although CAISO has put this process on hold, pending a resolution in the aforementioned docket, and PJM is presently only in the beginning of a stakeholder process on PFR that may include discussion on potential compensation mechanisms.[17]

- Fast response capabilities are generally uncompensated in RTOs/ISOs. Fast frequency response arrests deviations more quickly than conventional primary frequency response, thereby reducing the headroom reservations needed for frequency response;[18] yet frequency

[11] The figure cited in the DOE Staff Report incorrectly states storage is not capable of load following, which is one of several ramp services that is an essential reliability service. Storage is entirely capable of such activities—which are called for over a varying number of 5-minute dispatch intervals--as exemplified in its participation as a ramping resource for CAISO flexible capacity needs.

[12] *See* PJM Interconnection L.L.C., *Energy Price Formation and Valuing Flexibility*, June 15, 2017, at 4-5, available at http://www.pjm.com/~/media/library/reports-notices/special-reports/20170615-energy-market-price-formation.ashx

[13] ESA notes that storage resources are presently prohibited by rule from participation in MISO ramp product.

[14] *See* ISO-NE, *Procurement and Pricing of Ramp Capability*, Sep 20, 2017, available at https://www.iso-ne.com/static-assets/documents/2017/09/20170920-procurement-pricing-of-ramping-capability.pdf

[15] *See* FERC, *Staff Analysis of Uplift in RTO and ISO Markets*, Aug 2014, available at https://www.ferc.gov/legal/staff-reports/2014/08-13-14-uplift.pdf

[16] ESA has previously described how FERC's proposed rule compelling frequency response performance as a condition of interconnection would undermine price formation; see XX.

[17] PJM Interconnect, *Primary Frequency Response (PFR) Senior Task Force Charter*, 28 July 2017, available at http://pjm.com/-/media/committees-groups/task-forces/pfrstf/20170725/20170725-item-03-pfrstf-charter-post-meeting.ashx

[18] Fast frequency response arrests deviations faster, reducing overall reserves required and increasing in value as inertia decreases on the system. See page 10 of S. Newell et al. "Cost-Benefit Analysis of ERCOT's Future Ancillary Services (FAS) Proposal." Prepared by the Brattle Group for ERCOT. Dec 21, 2015. Available at http://www.brattle.com/system/news/pdfs/000/000/982/original/Cost-Benefit_Analysis_of_ERCOT's_Future_Ancillary_Services_%28FAS%29_Proposal.pdf?1450901946. See also ERCOT Staff's "Future Ancillary Service Team (FAST) and Technical Advisory Committee (TAC) Workshop #2" presentation to the ERCOT Technical Advisory Committee on Aug 25, 2014, available at http://www.ercot.com/content/meetings/fast/keydocs/2014/0825/FAST-TAC%208-25-14%20Workshop.ppt and ERCOT Future Ancillary Service Team's "Primary Frequency Response (PFR) / Fast Frequency Response (FFR) Assessment" presentation on

response is not compensated. Only PJM has a fast frequency regulation market product, which has reduced the overall regulation reserve requirement by 30%.[19] No contingency reserve products specify any value for faster response.

- Additionally, electric storage resources are excluded—by rule, not by technical capability—from providing contingency reserves in several RTOs/ISOs.[20]

Furthermore, DOE's proposed rule ignores system reliability and resilience needs stemming from the failure of electric infrastructure in the bulk power system. In recent years, extreme weather accounted for over 95% of all hours of major electric service interruption, with generation inadequacy and fuel supply emergencies accounting for less than 0.01% of all hours of major electric service interruption.[21] Extreme weather generally leads to failures of transmission and distribution infrastructure, not failures of generators or disruption of fuel supplies. When major U.S. electric system disruptions occur for reasons other than extreme weather, infrastructure tends to be of central concern, rather than fuel supply. For example, the 2003 Northeast Blackout was caused by a cascading failure of voltage controls and transmission lines.[22] DOE's focus on fuel assurance does not address these concerns; 90 days of onsite fuel is unimportant if the transmission wire fails to deliver it.

For these reasons, ESA supports consideration of mechanisms to adequately compensate the resilience attributes of grid infrastructure, not just generating resources. Some of those attributes may include: increasing generator deliverability and resource adequacy contribution through congestion

---

footnote continued
Mar 28, 2014, available at http://www.ercot.com/content/meetings/fast/keydocs/2014/0328/PFR_FFR%20Assessment_FASTworkshop_03282014.pdf

[19] See PJM's report, *Performance Based Regulation: Year One Analysis*, submitted on October 16, 2013 in Docket No. ER12-1204.

[20] ESA has outlined barriers to storage participation in reserves previously; see Comments of the Energy Storage Association, FERC Docket No. AD 16-20-000, June 6, 2016, available at https://elibrary.ferc.gov/IDMWS/search/results.asp. FERC has a pending rule that would remove such barriers; see FERC Notice of Proposed Rulemaking, *Electric Storage Participation in Markets Operated by Regional Transmission Organizations and Independent System Operators*, Docket No. RM16-23-000, Nov 17, 2016.

[21] *See* T. Houser, et al., "The Real Electricity Reliability Crisis," *Rhodium Group* website, Oct 3, 2017, available at http://rhg.com/notes/the-real-electricity-reliability-crisis

[22] *See* U.S.-Canada Power System Outage Task Force, *Final Report on the August 14, 2003 Blackout in the United States and Canada: Causes and Recommendations*, April 2004, available at https://www.ferc.gov/industries/electric/indus-act/reliability/blackout/ch1-3.pdf

relief; post-contingency operational capabilities, which can compensate for unexpected loss of units; and fast deployment as network upgrades, which can shorten grid planning lead times and avoid potential reliability-must-run contracts.

Additionally, DOE's proposed rule and the DOE Staff Report fail to contemplate contribution of distributed energy resources ("DERs") to system reliability. While DOE contemplates reliability and resilience attributes of the bulk power system, increasingly aggregations of DERs are providing services at the capacity of bulk system supply resources. Specifically, DERs provide resilience attributes at specific locations, making them capable of responding to failures of specific wires in a way that few bulk supply assets can; this is all the more accentuated by pilot programs by distribution utilities to utilize mobile, megawatt-scale electric storage units to flexibly meet local reliability needs.[23] Moreover, most electric service disruptions originate in distribution infrastructure, and DERs can play a role in mitigating the adverse impact of distribution service disruptions on bulk system operations. DER generators therefore have an important role to play for resilience, and their value should be contemplated as a part of DER participation in markets.

D. ESA respectfully recommends that FERC commence a proceeding to examine whether and how the full range of resilience attributes should be compensated, rather than proceed with DOE's proposed rule.

At the risk of oversimplifying our electric system is bound to a simple reality of physics—supply must precisely match demand at every moment, everywhere. If it does not, the result is equipment damage, service disruption, or blackouts. What we call reliability is the ability to maintain that match of electric supply and demand every moment every day, and to do so in the face of variable, unpredictable, and sometimes extreme system conditions. Resilience, on the other hand, is the ability to maintain or rapidly restore that match of supply and demand following a sudden and

[23] *See* P. Maloney, "How ConEd's mobile battery REV demo could build a new storage business model," *Utility Dive*, Mar 7, 2017, available at http://www.utilitydive.com/news/how-coneds-mobile-battery-rev-demo-could-build-a-new-storage-business-mode/437364/

disruptive external event. While fuel assurance may be a part of reliability and resilience, flexibility is also critical to both reliability and resilience—to ensure uninterrupted power is delivered to consumers whenever and wherever they need it.

ESA recommends as a first step establishing a framework for quantifying resilience attributes, including establishment of resilience definitions and metrics. Without clear definitions of resilience, FERC, RTOs/ISOs, and market participants lack a common ground on which to base discussion, and FERC will be unable to compensate resilience attributes in a technology-neutral manner that upholds just and reasonable rates. Recent work by the National Academies,[24] Sandia National Laboratory,[25] and NARUC[26] present key considerations for establishing definitions and metrics associated with electric system resilience. NERC, working with DOE, FERC, and stakeholders, would be an appropriate entity for devising this framework. ESA further recommends that this effort undertake to look at the full range of resilience attributes—essential reliability services, fuel assurance, flexibility, and other attributes—as they correspond to the actual sources of vulnerability in the electric system, i.e., not just supply, but also infrastructure.

Following that achievement, ESA recommends that FERC convene a technical conference for identifying and valuing the full set of resilience attributes. FERC and stakeholders should determine what technology-neutral market rules and products could provide an effective price or other compensation to signal entry and exit of the supply of any single resilience attribute. As part of this technical conference, FERC should consider whether existing market mechanisms are sufficient

[24] *See* National Academies of Sciences, Engineering, and Medicine. 2017. *Enhancing the Resilience of the Nation's Electricity System*. Washington, DC: The National Academies Press. https://doi.org/10.17226/24836.
[25] *See* E. Vugrin, et al., *Resilience Metrics for the Electric Power System: A Performance Based Approach*, Sandia National Laboratory, Feb 2017, available at http://prod.sandia.gov/techlib/access-control.cgi/2017/171493.pdf
[26] *See* M. Keogh & C. Cody, *Resilience in Regulated Utilities*, NARUC, November 2013, available at https://pubs.naruc.org/pub/536F07E4-2354-D714-5153-7A80198A436D. See also P. Stockton, *Resilience for Black Sky Days: Supplementing Reliability Metrics for Extraordinary and Hazardous Events*, NARUC, Feb 2014, available at http://www.sonecon.com/docs/studies/Resilience_for_Black_Sky_Days_Stockton_Sonecon_FINAL_ONLINE_Feb5.pdf

for ensuring the provision of needed resilience attributes—that is, whether an additional payment for a specific resilience attribute is even needed.

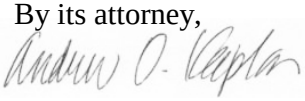
IV. CONCLUSION

Price formation is critical for markets to meet reliability and resilience needs at low cost. ESA does not agree with DOE's proposed rule because it lacks any mechanisms for a considered and comprehensive effort to establish a framework for identifying, measuring, and valuing resilience attributes of various resources in the electric system. Indeed, no market is perfect, and all FERC-jurisdictional markets are struggling to properly define and value the flexibility attributes that are increasingly important to resilience. However, the basic framework of competitive wholesale markets has served America's consumers well so far, and FERC should staunchly defend and pursue improvements on this framework to ensure that all needed services to provide reliable and resilient service are compensated at just and reasonable rates.

Respectfully submitted,

ENERGY STORAGE ASSOCIATION

By its attorney,



Andrew O. Kaplan
PIERCE ATWOOD LLP
100 Summer Street
Boston, MA 02110
Email: akaplan@pierceatwood.com
Telephone: 617.488.8104

Dated: October 23, 2017

CERTIFICATE OF SERVICE

I, Anne O'Hanlon, hereby certify that the foregoing Comments were served via electronic mail to the service list.

Dated in Boston, MA this 23rd day of October 2017.

Anne O'Hanlon, Legal Executive Assistant
PIERCE ATWOOD LLP
100 Summer Street
Boston, MA 02110
Phone: 617.488.8123
aohanlon@pierceatwood.com