UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Grid Reliability and Resilience Pricing : Docket No. AD18-7-000

COMMENTS OF THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

I. INTRODUCTION

The Pennsylvania Public Utility Commission ("PAPUC") hereby submits its Comments ("Comments") in response to the filing of PJM Interconnection L.L.C. ("PJM") dated March 8, 2018 regarding the resilience issues and inquiries identified in the Federal Energy Regulatory Commission's ("FERC") Order Terminating Rulemaking Proceeding, Initiating New Proceeding, and Establishing Additional Procedures issued on January 8, 2018.[1] The PAPUC generally supports the efforts taken thus far by PJM to improve the resilience of the PJM grid and further recommends adoption of some, but not all, of PJM's recommendations to FERC for moving forward on this important endeavor. However, the PAPUC is concerned that some of PJM's proposed design, operational and market modifications, offered in the name of resilience, may shortchange or even bypass normal PJM stakeholder deliberative processes. The PAPUC additionally offers its own recommendations regarding PJM's suggested changes to FERC policy regarding establishing grid resilience criteria for regional transmission organizations and

[1] *Grid Reliability and Resilience Pricing*, Dkt. No. RM18-1 (Order issued January 20, 2018).

independent system operators ("RTO/ISOs"). These recommendations are designed to protect and incorporate the interests of state commissions in any future requirements implemented by FERC in this proceeding.

A. Interest of the PAPUC

The PAPUC is the agency responsible for regulation of jurisdictional electric distribution and natural gas facilities and retail rates, as well as ensuring safe, adequate and reliable electric and natural gas service to the Commonwealth with its 12.77 million residents and 300,000 businesses.[2] To a lesser extent, it is also responsible for the regulation of certain aspects of transmission electric service and facilities. The PAPUC and other state agencies are collectively responsible when natural or man-made events affect basic utility services, the disruption of which may threaten the health and safety of Commonwealth residents.[3] Recent weather events, such as the 2014 Polar Vortex, the cold weather events of January 2018 and the Sunoco Mariner East event[4] are just three incidents that demonstrate the potential severity of "low frequency, high impact" events that threaten continuity of basic service and public health and safety.

The PAPUC regulates several large and medium-sized electric distribution companies ("EDCs"), transmission owning utilities and large and medium-sized natural gas utilities. The PAPUC also has responsibility for enforcing federal pipeline safety regulations that encompass thousands of miles of interstate and intrastate natural gas lines.

[2] 66 Pa. C.S. § 101 *et seq.* ;U. S. Department of Energy Sector Risk Profile at 1.
[3] 52 Pa. Code § 191.1 *et seq.*
[4] http://www.puc.pa.gov/pcdocs/1556680.pdf

The PAPUC oversees vibrant electric and natural gas retail choice programs with over 300 electric and natural gas suppliers.[5]

Pennsylvania produces 223.4 Terrawatt-hours ("TWh") (or 6%) of the nation's electricity and consumes 144.7 TWh (4%) of the nation's electric production.[6] Intrastate electric generation is comprised of 182 electric power plants (nuclear, coal, natural gas, oil, hydro and renewable), 1,046 miles of high voltage transmission lines (above 230 kilovolts) and 350 miles of transmission lines below 230 kilovolts).[7]

Natural gas infrastructure is also significant in the Commonwealth with 10 gas processing plants, 54 storage fields, 8,820 miles of interstate gas pipelines and thousands of miles of natural gas distributions lines.[8] Additionally, as a major producer of natural gas from both the Marcellus and Utica Shale deposits, there are 57,000 active gas wells and thousands of miles of gathering lines that deliver gas to the interstate pipelines.[9] Pennsylvania is also home to four petroleum refineries, 73 terminals, 26 miles of crude oil pipelines and 4,140 miles of liquid product pipeline.[10] The PAPUC has the responsibility for enforcing natural gas pipeline safety regulations under 49 C.F.R. § 192 and the Pipeline and Hazardous Material Safety Administration ("PHMSA").

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[5] Lists of PAPUC-licensed electric generation suppliers and natural gas suppliers are available on the PAPUC's website at http://www.puc.pa.gov/consumer_info/electricity/suppliers_list.aspx and http://www.puc.pa.gov/consumer_info/natural_gas/natural_gas_shopping/natural_gas_suppliers_list_.aspx, respectively.
[6] U.S. Department of Energy Sector Risk Profile (2014-2015) at 1.
[7] Energy Information Administration (2013) Form 860; U.S. Department of Energy Sector Risk Profile (2014-2015) at 2.
[8] U.S. Department of Energy Sector Risk Profile (2014-2015) at 6.
[9] *Id.* at 6.
[10] *Id.* at 4.

The most common natural hazards affecting the delivery of electricity and natural gas in Pennsylvania are thunderstorms, lightning, winter storms and extreme cold. Extreme weather events, both cold and warm, are expected to be more common in the future.[11] Fortunately, Pennsylvania has not been the target of any man-made disruptive events, either physical or cyber, but the potential for such unforeseen events occurring in the future cannot be discounted.

The PAPUC actively participates in operational planning, drills, training and informational exchanges related to preparation for emergency events with PJM, federal agencies, such as Department of Homeland Security ("DHS") and PHMSA, and state agencies with emergency responsibilities, such as the Pennsylvania Emergency Management Agency ("PEMA"). Most recently, the PAPUC's Bureau of Technical Utility Services participated in a "Black Sky" exercise sponsored by U.S. Department of Energy among others. The PAPUC also participates in informational exchange opportunities offered through organizations such as the National Association of Regulatory Utility Commissioners ("NARUC") and other organizations. Further, the PAPUC requires its jurisdictional utilities to maintain their facilities for reliability and safety as prescribed by PAPUC regulations.

Against this back drop, the PAPUC commends FERC for initiating this proceeding and encourages FERC to fully consider the responsibilities and obligations

[11] Intergovernmental Panel on Climate Change, 2014 Synthesis Report at 7-8.

of the state commissions in its development of future grid resilience requirements imposed on PJM and other RTO/ISOs. State commissions should not be viewed as passive observers in a FERC initiative to promote increased grid resilience within the PJM footprint. The PAPUC has an active and ongoing role in monitoring and enforcing physical security and safety regulations for its jurisdictional electric distribution facilities and the interstate and intrastate natural gas pipelines that serve electric generators. When disruption of service occurs, whether at the generation, transmission or distribution level, utility companies under the jurisdiction of state commissions are the first entities to be tasked with responding to inquiries from affected customers. State commissions should be "at the table" as decisions regarding improved grid resilience are made.

B. The PJM Filing

PJM's grid resilience filing summarizes its ongoing efforts to address grid vulnerabilities that threaten the safe and reliable operation of the bulk electric system ("BES"). PJM's comments propose detailed and extensive sets of policies, procedures and market reforms to address high impact, low-probability events that may not be anticipated or prevented by existing quantitative, probability-based analyses. PJM's filing describes a framework of historical, experience-based planning and operational strategies coupled with focused recommendations that build on its existing programs and initiatives (such as Capacity Performance, electric-gas coordination, current risk assessment efforts). PJM requests greater FERC oversight and involvement in establishing verifiable standards for measuring resilience, more federal agency transparency and access to critical information.

From the PAPUC's perspective, the multiplicity of man-made and physical/cyber threats to grid system resilience and the pressing need to restore service after a disruptive event obligates all stakeholders - RTO/ISOs, transmission owners, generators, electric distribution companies, interstate and intrastate pipelines and state/federal regulators - to be operating "on the same page" without the usual obstacles to information exchange and transparency. PJM's filing partially addresses those concerns through recommendations to streamline and "cut through" existing barriers to information flow between federal agencies while maintaining necessary confidentiality protections.

PJM's current and ongoing efforts include adoption of a combination of discourse-based and precaution-based strategies to identify, prevent and/or mitigate threats to grid resilience. PJM's efforts have encompassed not only generator, transmission and other members but also natural gas infrastructure vulnerabilities.[12] PJM utilizes other industry resources, such as the North American Electric Reliability Corporation ("NERC"), the Edison Electric Institute ("EEI") and industry associations coupled with interaction with relevant federal agencies that have experience in assessing resilience challenges.[13]

The PAPUC finds PJM's proposed grid resilience framework to be a well-designed, analytically-based foundation for developing a more robust resiliency plan going forward. However, as outlined herein, the PAPUC has concerns over the potential scope and costs associated with implementation of PJM's grid resilience program.

[12] PJM Filing at 14-16.
[13] *Id.* at 14-18. PJM/federal agency interactions include Federal Emergency Management Agency ("FEMA"), U.S. Department of Homeland Security ("DHS"), U.S. Department of Energy ("DOE") and U.S. Department of Defense ("DOD").

Moreover, some of PJM's recommendations, especially in the market design arena, appear to utilize the grid resilience docket as another forum to advocate for specific market modifications, such as energy price formation, that are not immediately germane to the resilience discussion.[14]

In our view, resilience is a closely-related concept to reliability—an area over which FERC has extensive, but not exclusive, jurisdiction. The PAPUC urges FERC to clearly articulate its jurisdiction over resilience and, to the extent FERC finds that its jurisdiction over the electric reliability of the bulk power system allows it to regulate resilience and set appropriate standards, it should state so. The PAPUC, however, does not share PJM's position that resilience also resides "within the Commission's existing authority with respect to the establishment of just and reasonable rates, terms and conditions of service under the Federal Power Act."[15] Therefore, clear and precise justification of FERC's authority on this matter will be beneficial prior to any initial steps in regulating resilience.

II. THE PAPUC GENERALLY SUPPORTS PJM'S EFFORTS TO IMPROVE GRID RESILIENCE

A. PJM's Modified Definition of Resilience Is Reasonable

A principal obstacle to establishing meaningful and workable resilience guidelines, standards and metrics is the absence of a common definition from which all stakeholders may operate. Differentiating reliability from resilience has also presented

[14] *Id.* at 65-80.
[15] PJM Filing at 5.

regulatory confusion. FERC proposed its own working definition of "resilience" in its Grid Resilience Order—" 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."[16] PJM has proposed a number of modifications to the FERC definition which are worthy of consideration and should be adopted.[17] These include:

- RTO/ISOs should not be required to plan for a BES to withstand an event regardless of cost or the incremental value of an improvement for a contingency unlikely to occur. The PAPUC concurs with this proposed modification insofar as the potential cost to customers to achieve a resilient electric grid must be balanced with the likelihood of occurrence of the disruptive event. Probabilistic analysis coupled with access to accurate data should be the determinant for the level of expenditure necessary to eliminate a vulnerability or address a threat assessment.

- RTO/ISOs cannot be expected to anticipate all risks and vulnerabilities to the BES. The PAPUC concurs as this would require RTO/ISOs to meet a "standard of infallibility" which is both unrealistic and expensive.

- RTO/ISOs need to first identify vulnerabilities and threats *before* designing mechanisms to prevent future disruptions. The PAPUC concurs insofar as threat/vulnerability identification must logically precede the expensive process of investing resources to prevent the occurrence of disruptive events.

- PJM requests FERC to issue a definition of resilience that is encompassed within FERC's existing authority under Section 215 the Federal Power Act ("FPA"). The PAPUC concurs with this recommendation. FERC must definitively find that it has the legal authority and jurisdiction under the FPA to require RTO/ISOs to implement operational and planning measures to ensure grid resilience.[18]

[16] FERC Grid Resilience Order at 13.
[17] PJM Filing at 5-6, 9-12.
[18] *Id.*

The PAPUC contends that any resiliency program will only be effective if the proper measurement via meaningful, industry-accepted metrics is established, the quantification methods of the efforts taken by the RTO/ISO are in place and a process by which the costs of proposed resilience actions may be assessed before the expenditures are made. The PAPUC agrees with the premise that resilience is closely-related to reliability but urges FERC to articulate clearly the extent of its jurisdiction over resilience. The RTO/ISO community and Electric Reliability Organizations (EROs) are best suited to design these measurement standards, but FERC oversight and validation of these metrics will be necessary to ensure that individual RTO/ISO resiliency objectives are achieved at reasonable cost, assuming FERC concludes it has the requisite authority to prescribe resilience standards. It is worth noting that resilience as a standard should not be envisioned as a "one size, fits all" standard. Different states and regions may be willing to accept and bear the costs of differing levels of resilience.

The PAPUC opposes PJM's suggestion[19] that resilience attributes of stakeholders (be they generators or transmission providers) should be compensated. As will be addressed later, PJM's continuing efforts to improve existing products, such as the capacity and energy markets, fuel diversity and ancillary services markets are already being compensated through the markets as stand-alone services. The PAPUC does not endorse a further overlay of cost recovery for these specialized services or particularized

[19] *Id.* at 65-80.

attributes on "contributions to resiliency" which may well result in overcompensation for these services.

B. Grid Resiliency Standards Will Only Be Effective With FERC Oversight

PJM requests that FERC take the following actions to define and interpret its authority over resilience of the BES as follows:

- FERC should establish a filing process that allows an RTO/ISO to receive verification of the reasonableness of its assessments of vulnerabilities, threats and mitigation including FERC utilization of information that may be available to it, but not available to the RTO/ISO because of national security issues. Those assessments, once verified, could then form the basis for RTO/ISO actions under its planning or operations authority consistent with its tariffs. Information from other relevant federal agencies and NERC should be incorporated into the verification process as needed.[20] The PAPUC agrees with this recommendation insofar as FERC oversight and validation of the RTO/ISO assessment of threats and vulnerabilities, based on a verification process that benefits from additional input from other federal agencies, establishes an appropriate regulatory model to define and impose reasonable limits and safeguards on the degree of mitigation efforts and associated costs.

- FERC needs to provide regulatory oversight to apply to resilience, vulnerability and threat analyses that can then guide and anchor subsequent RTO/ISO planning, market design, and/or operations directives. FERC should articulate in this docket that the regional planning responsibilities of RTOs currently mandated under 18 CFR § 35.34(k)(7), FPA Section 217 and the NERC (which require RTOs to plan to provide reliable transmission service and assess extreme events to the BES), includes an obligation to assess resilience.[21] The PAPUC agrees with this recommendation as needed to embed resilience planning into the appropriate statutory and regulatory framework. The PAPUC has reservations about PJM's position that resilience should be embedded in PJM's market design.

- After confirming that resilience is a component of such planning, FERC should initiate appropriate rulemakings or other proceedings to further articulate the RTO and ERO role in resilience planning including under Section 215, 16 U.S.C. § 824o of the FPA. Through this process, PJM would be seeking verification that

[20] PJM Filing at 5, 37-38, 40-41.
[21] PJM Filing at 5, 33-34.

its vulnerability identification or threat assessment is consistent with information (including classified information not necessarily available to PJM) held by the federal government and thus should be used to guide future actions.[22] The PAPUC generally agrees with this recommendation only to the extent that additional rulemakings or other proceedings are necessary. Threats to resilience are a clear and present threat and appropriate measures need to be implemented in the short term. The lengthy process associated with rulemaking proceedings may not be consistent with addressing near-term threats.

- FERC should address proposed market reforms and related compensation mechanisms.[23] The PAPUC does not endorse the recommendation to embed resilience in PJM's market design. On the contrary, the PAPUC advocates for FERC to address the more immediate resilience recommendations discussed herein before addressing market reforms to implement resilience measures.

- FERC should permit RTO/ISOs to submit a subsequent filing, including any necessary proposed tariff amendments to permit non-market operations during emergencies, extended periods of degraded operations, or unanticipated restoration scenarios. Such filings could include provisions for cost-based compensation when the markets are not operational or when a wholesale supplier is directed to take certain emergency actions by PJM for which there is not an existing compensation. The PAPUC recognizes that there may be certain scenarios in which permitting non-market operations during emergencies may be beneficial such as prolonged periods of locational marginal pricing (LMP) that subject market participants to shortage pricing. However, we have concerns about the extent to which PJM is provided such authority and request FERC to ensure that any RTO/ISO filing clearly articulate the scenarios in which the authority should be granted and the limitations on that authority.

The PAPUC endorses PJM's recommendations which requests FERC to implement a regulatory framework, pursuant to its authority under the FPA, that authorizes RTO/ISOs to move forward to identify, prevent and mitigate vulnerabilities and threats both physical and cyber. PJM recognizes that the effectiveness of any

[22] PJM Filing at 5. The verification would relate solely to the identified vulnerability or assessed threat and would not preclude challenges in the context of a rate proceeding or otherwise as to the cost efficiency of addressing the vulnerability or threat. affirmative obligations and standards to plan, prepare, mitigate, etc.
[23] PJM Filing at 5, 65-80.

RTO/ISO grid resiliency plan will only succeed if FERC establishes the ground rules for such a plan through policy and regulation. As PJM notes, RTO/ISO stakeholder proceedings only work when operating within a defined set of metrics and criteria and with firm deadlines. Resilience, like any regulatory concept, must proceed from a framework that provides policy guidance, imposes attainable standards and is reinforced by a meaningful verification process. FERC has demonstrated its regulatory prowess in moving both the wholesale electric and natural gas markets through periods of profound change through the prudent and thoughtful exercise of its statutory authority. Exercise of that authority will be needed to incentivize the RTO/ISO community and other market participants to continue to invest the stakeholder resources, infrastructure commitments and market reforms needed to meet future physical and cyber threats.

Simultaneously, FERC must be cognizant that RTO/ISOs do not receive a license to "gold-plate" the generation, transmission and cyber assets of its members to achieve standards of resiliency that are disproportionate to a particular vulnerability or threat assessment. Excessive expenditures to achieve the last increment of protection from a threat that may never materialize imposes unneeded cost on load serving entities and ultimately customers. Hardening of generation and transmission assets against both physical and cyber threats should always be prudently balanced against the perceived threat and the cost to consumers.

The PAPUC supports PJM's recommendation that FERC examine and clearly articulate its authority under relevant provisions of the FPA.[24] This determination would be a prerequisite to the issuance of any policy or promulgation of regulations. This preliminary determination may also assist FERC in any legal challenges to its future determinations in the resiliency arena.

PJM identifies as an obstacle the lack of access to needed confidential and sensitive information and data in the possession of other federal agencies.[25] This is especially significant in the cybersecurity arena, where federal agencies are monitoring and reacting to cyber-related activities of "bad actors" but are constrained from sharing the information with the private sector (or even state and local governments) because of restrictions on dissemination. Timely RTO/ISO response to a cyber threat may only be possible when information is transmitted in time for the impacted entity to respond to that threat, modify its cyber-defenses to accommodate the threats and mitigate any damage from the threat. FERC is in a unique position to serve as a coordinator to improve transparency between other federal agencies tasked with cybersecurity responsibilities (DOD, DOE, DHS, FEMA, etc.) and the RTO/ISOs and their generation and transmission members to facilitate timely dissemination of information while protecting the confidentiality of sensitive information.

While the PAPUC is supportive of greater interagency cooperation and sharing of confidential data, FERC should also be cognizant of the potential for excessive RTO/ISO

[24] *Id.* at 5, 33-34.
[25] *Id.* at 5-6, 8,27-29,62-63.

and member access to industry-specific information. To the extent this information is transmitted to the RTO/ISO under the justification of resiliency planning, the risk exists that RTO/ISO planners may utilize confidential industry data in its market design analysis that unfairly affects costs to those industries. Additionally, the sharing of confidential data between RTO/ISO members, under the guise of resilience and threat assessment/damage mitigation, could lead to competitive advantages or disadvantages in the industry and provides greater risk that such data is released on a broader scale (e.g., to the public at large). FERC must carefully weigh security and confidentiality aspects of data sharing to ensure only those who truly need the data are receiving access to it and are protecting it from being disseminated in a broader manner.

C. FERC Should Adopt Some Of PJM's Recommendations On Gas/Electric Coordination

PJM advocates for improved coordination and communication requirements between RTO/ISOs and interstate natural gas pipelines to address resilience as it relates to natural gas-fired generation in its footprint.[26] A number of initiatives are suggested:

- PJM requests additional efforts by FERC to encourage sharing of pipelines' prospective identification of vulnerabilities and threats on their systems and, sharing on a confidential basis in real-time, the pipelines' modeling of such contingencies and communication of recovery plans. Modifications to FERC's Order 787 may be necessary.

- PJM requests an increased focus on restoration planning coordination between RTOs and pipelines as each entity has valuable information that can affect the other's timely restoration.

[26] PJM Filing at 5, 59-66.

- PJM urges FERC to encourage the development of additional pipeline services tailored to the flexibility needs of natural gas-fired generation to encourage appropriate tailoring and pricing of services beyond today's traditional firm/interruptible paradigm.

- FERC should encourage RTOs as well as interstate pipelines to improve generation interconnection coordination with pipelines to better align interconnection activities and timelines and minimize potential issues associated with generation facilities located in areas on pipeline systems where reliability or resilience benefits may be sub-optimal.

- FERC should require the harmonization of cyber and physical security standards between the electric sector and the natural gas pipeline system. Interagency cooperation with the Transportation Security Administration ("TSA") and Pipeline and Hazardous Materials Safety Administration ("PHMSA") will be necessary.

- There should be greater communication and coordination between pipelines and local distribution companies ("LDCs") that supply wholesale generation and FERC should support such efforts including evaluating whether communication and coordination obligations should be imposed on LDCs that supply jurisdictional wholesale generation.

- PJM is moving forward on requiring dual fuel capability at all Black Start Units but urges, as the next step, coordination across the nation of a consistent means to determine Critical Restoration Units and the development of criteria to assure fuel capability to such Critical Restoration Units.

- RTOs, as part of their restoration role, should be asked to demonstrate steps they are taking to improve coordination with other critical interdependent infrastructure systems (e.g., telecommunications, water utilities) that could be impacted through vulnerabilities and threats as raised in PJM's filing.[27]

PJM's resilience filing proposes an extremely ambitious set of recommendations that are designed to resolve longstanding barriers to effective electric/gas coordination with reference to gas-fired generation. While the PAPUC believes some of the above

[27] *Id.*

recommendations have merit, the scope of regulatory, operational and planning changes that need to occur may ultimately be more disruptive and costly to the markets and customers than a focused examination of which gas/electric coordination efforts could be cost-effectively implemented in the short term. FERC has already been proactive in the gas/electric coordination area with Order 809, which revised the interstate natural gas nomination process by adopting standards proposed by the North American Energy Standards Board ("NAESB").[28] Additionally, Order 787 amended FERC's regulations to provide explicit authority to interstate natural gas pipelines and public utilities that own, operate, or control facilities used for the transmission of electric energy in interstate commerce to share non-public, operational information with each other to promote reliable service or operational planning on either the public utility's or pipeline's system.[29] PJM has implemented a robust electric/gas coordination effort that continues to evolve.[30]

The PAPUC agrees with some of PJM's recommendations. The enhanced sharing of information between PJM and interstate pipelines (Bullet 1) would ensure that the RTO has the best information in real-time to determine whether to increase operating reserves or take other emergency actions in response to a pipeline break or other

[28] *Coordination of the Scheduling Processes of Interstate Natural Gas Pipelines and Public Utilities*, Order 809, Dkt. No. RM14-2 (Issued April 16, 2015).
[29] *Communication of Operational Information Between Natural Gas Pipelines and Transmission Operators*,Order 787, Dkt. No. RM13-17 (November 22, 2013), *Order on Rehearing* (June 9, 2014).

[30] http://www.pjm.com/markets-and-operations/ops-analysis/gas-electric-coordination.aspx

contingencies occurring on the pipeline system. Although effective coordination and communication with the pipelines serving the PJM region has been achieved, a greater focus on real-time coordination of modeling of contingencies and real-time communication of information may provide some benefits to gas/electric coordination when resilience issues arise. The PAPUC also supports greater harmonization of restoration efforts (Bullet 2) and physical and cyber security standards (Bullet 5) between electric utilities and gas pipelines as cost-effective initiatives that could reasonably prevent threats to the electric grid. Coordinated threats from foreign actors can be expected to target both the supply source and the generation units. The time is long past where the electric generation and gas transmission industries can afford to retain separate and incongruent policies and practices relating to service disruption and threat assessments in the planning, operation, crisis response and restoration of service spheres.

In this area, the PAPUC endorses PJM's suggestion that FERC direct an examination (via a matrix) that illustrates areas of common approach and difference for each of the subject areas governed by NERC, PHMSA and TSA guidelines.[31] This initiative should be the first step in a FERC-directed generic proceeding that comprehensively examines the policy and practice commonalities and divergences between the transmission and pipeline operators. This analysis should encompass all of the topics highlighted by PJM, including physical and cyber security standards,

[31] PJM Filing at 55-63.

contingency approaches, modelling of adverse impacts to mitigation, planning and operation and restoration of services.

Other PJM recommendations regarding gas/electric coordination, such as increasing pipeline services for generation flexibility purposes and pipeline/local distribution company communication (Bullets 3 and 6) may merit further consideration but not purely in the context of resiliency planning. PJM has been advocating for greater coordination and cooperation between generators and the pipeline industry for reasons more associated with market operations and efficiencies than resilience. The efforts outlined in Bullets 3 and 6 should be considered by FERC outside of the resiliency context.

The PAPUC does challenge PJM's suggestion in Bullet 4 encouraging RTO and interstate pipeline coordination to improve generator interconnection locations and timelines. PJM's proposal for pipeline interconnection implies location of generation should be a two-party determination between the RTO and the interstate pipeline. Generation siting is, and has always been, a state/local responsibility and the location of generation assets are integral to a state's resource planning ability and are, in some states, under the jurisdiction of siting authorities. Unless assistance is requested by the states, PJM's activities regarding generation siting should not venture into what is more properly state supply-side planning.

PJM's suggestions above at Bullets 7 (national plan to identify Critical Restoration Units) and 8 (improvement of communications across all utility platforms) also merit

consideration but should not be given high priority until other more achievable objectives are achieved.

D. State Involvement in Development Of Grid Resiliency Standards Is Critical To Their Success

In developing resiliency standards for the PJM region, FERC must consider the role of the state commissions and affiliated state agencies, such as state emergency management, environmental protection and local agencies, which all have a stake in ensuring that electric, gas and other utility vulnerabilities and threats are identified and addressed. In Pennsylvania, the PAPUC works collaboratively with the Governor's Office, PEMA, Department of Environmental Protection and, when necessary, county and municipal governments to address system emergencies.[32] PJM's advocacy for greater federal agency coordination is commendable, but it is just as important that state and local agencies and authorities be considered in both the planning as well as the design, operation, testing and restoration development phases of a resiliency plan. Importantly, access to information that may be essential to assisting state and local agency service restoration efforts should be considered in designing an effective RTO/ISO-administered resiliency framework.

The PAPUC reminds FERC that resilience begins at the electric distribution level which is subject to state commission jurisdiction. Whether caused by natural or man-made events, electric service disruption is ultimately felt at the level of the residential,

[32] The PAPUC has been coordinating with several state agencies for information sharing through the Commonwealth's Fusion Center and in the development of the Commonwealth's Cyber Annex through the Pennsylvania Department of Homeland Security.

commercial, industrial and institutional customer. FERC-mandated, RTO/ISO-implemented resilience measures will inevitably "filter down" to the EDC level and result in costly distribution line upgrades or replacements and/or system modifications. These costs will be recovered from retail customers' distribution rates. While the PAPUC is fully supportive of implementing resiliency components into the PJM grid, there must be mechanisms built into the PJM resilience design and planning process that correctly match the threat mitigation effort with the vulnerability so that risk of "gold plating" the system is minimized. Resiliency-driven system improvements should also be coordinated with existing EDC planning processes to upgrade distribution systems.

For example, FirstEnergy Corporation ("FE") is in the process of implementing a distribution system improvement project entitled Energizing the Future ("ETF") for its electric transmission and distribution companies in Pennsylvania. The ETF program will span several years and will amount to hundreds of millions of dollars of infrastructure investment. The ETF program includes improvements in both FE's transmission and distribution physical and cybersecurity components. Coordination of these existing, multi-year system upgrade efforts with any prospective resilience requirements will be necessary to avoid costly investments that may be insufficient to address particular system vulnerabilities or, alternatively, be out-of-proportion to the threats to be mitigated.

The PAPUC may be required to revisit its regulations for distribution system reliability, safety and physical/cyber security depending on the scope of FERC's requirements. For example, the PAPUC extensively regulates EDC distribution and below-100kv transmission lines for reliability and safety and authorizes the siting of

electric transmission facilities. Adoption of increased resilience standards with "trickle-down requirements" for distribution and jurisdictional transmission systems may present time-consuming and costly regulatory burdens on state commissions and retail ratepayers. The PAPUC reminds FERC that the "filter down" impact of resiliency requirements at the wholesale generation and transmission level could have consequential cost impacts on retail ratepayers. Consequently, the importance of maintaining proportionality in matching the resilience requirement with the likely threat and/or vulnerability remains paramount.

E. PJM's Recommendations Regarding Market Reforms Are Out of Scope And Must Not Override The Normal PJM Stakeholder Processes Nor Be An Excuse To Unnecessarily Accelerate Ongoing Market Reform Initiatives

PJM proposes several market-based recommendations that are directed toward promoting "resilience" of wholesale supply. PJM's far-ranging requests for market reform changes cover an expansive area: (1) tariff amendments to permit non-market operations during emergencies, extended periods of degraded operations, or unanticipated restoration scenarios, including cost-based compensation to reimburse wholesale suppliers when markets are non-operational;[33] (2) compensation for resilience characteristics for shortage pricing, reactive service and operating reserves;[34] (3)

[33] *Id.* at 65-66. PJM requests that FERC authorize RTO/ISOs the necessary authority (or to clarify existing authority under PJM's governing documents and Manual 13), during period of degraded operations or during restoration periods of unanticipated length, to take certain extraordinary actions such as exercising the right to suspend operations, direct generator operations and provide cost-based compensation.

[34] *Id.* at 67-72,75-77.

improvements to Black Start requirements;[35] (4) improved energy price formation that values and compensates resources for resilience characteristics;[36] (5) integration of distributed energy resources ("DER"), storage and other developing technologies;[37] and (6) improvements in NERC standards.[38]

The PAPUC does not endorse PJM's suggested wholesale market reforms as being appropriate for consideration in this docket for several reasons. First, as is amply demonstrated by PJM's own filing, resilience is a concept more closely-related to reliability than market design and rate setting. Resilience is a function of addressing high impact, low frequency events which are most likely to impact electric utility cyber and transmission assets and gas pipeline infrastructure. PJM and FERC's immediate priorities should focus on threats and vulnerabilities that may be directed to those targets.

Second, PJM's aggressive foray into market reform territory in this case undercuts the progress already occurring in the PJM stakeholder and FERC venues on these very topics. For example, PJM is moving ahead with a request for proposals for Black Start services that could be impacted if rules governing compensation for this service change.[39] Energy price formation is a subject currently being debated in the PJM Energy Price Formation Task Force with a final recommendation expected from the PJM stakeholder process in late 2018 and a FERC filing due thereafter.[40] The PAPUC contends this

[35] *Id.* at 69-70.
[36] *Id.* at 78-80.
[37] *Id.* at 65-80.
[38] *Id.* at 72-73.
[39] See RTO-Wide Black Start RFP presentation to the Operating Committee dated February 6, 2018.
[40] http://www.pjm.com/-/media/library/reports-notices/special-reports/20171115-proposed-enhancements-to-energy-price-formation.ashx

process should proceed on a normal timeline without undue influences relating to resilience pricing.

Regarding emerging technologies, FERC recently issued an omnibus order on energy storage with which the wholesale electricity markets are currently grappling.[41] Distributed energy resources are also in the early stages of FERC consideration with a technical conference to discuss DER participation in the wholesale electricity markets having occurred on April 10-11, 2018.[42]

Finally, PJM's underlying purpose for incorporating all of these market reform requests in its resilience filing is to reinforce the theme that many, if not all, market products contribute to resilience and thus are deserving of compensation. To date, PJM has failed to prove this premise to be true. This docket is not the appropriate place for such far-reaching, market influencing determinations.

PJM also proposes modifications to existing NERC standards such as CIP-014 and other BES infrastructure standards.[43] The PAPUC agrees with PJM that these standards may need to be revisited and, if proven necessary, revised to identify and mitigate threats to transmission stations, substations and primary control centers. However, revision of NERC standards is a complex, time-consuming process that should be allowed to proceed on its own timeline without an accelerated impetus from this docket. Moreover, revising

[41] *Electric Storage in Regional Transmission Organizations and Independent System Operator*, Dkt. Nos. RM16-23, AD16-20 (Order issued February 28, 2018.)
[42] *Participation of Distributed Energy Resource Aggregations in Markets Operated by RTO/ISOs*, Dkt.No. RM18-9; *Distributed Energy Resources-Technical Consideration for the Bulk Power System*, Dkt. No. AD18-10
[43] PJM Filing at 72-74.

NERC standards to reflect resilience concerns is, at best, a follow-on exercise after primary RTO specific measures are agreed upon and implemented. The PAPUC again underscores the need to be sensitive to the costs to retail customers from NERC-level changes that increase transmission costs to a magnitude that is disproportionate to the level of threat or vulnerability to be addressed.

III. CONCLUSION

For the foregoing reasons, the PAPUC respectfully requests its Comments be considered and recommendations adopted in the final formulation of any rulemaking, policy statement or other implementation action in this docket.

Respectfully submitted,

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Dated: May 9, 2018

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that I am on this date serving a copy of the foregoing document upon each person designated on the official service list compiled by the Federal Energy Regulatory Commission in accordance with the requirements of Rule 2010 of the Commission's Rules of Practice and Procedure.

Dated at Harrisburg, PA this 9th day of May 2018.

Respectfully submitted,

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