

Regulatory Update

May 24, 2018

Summary Comments on Grid Resilience

By May 9, more than 100 stakeholders filed comments on FERC's proceeding on grid resilience. See *Grid Resilience in Regional Transmission Organizations and Independent System Operators*, Docket No. AD18-7-000 (January 8, 2018). AGA filed comments in this proceeding highlighting the reliability and resilience benefits of natural gas, as well as responding to specific comments made by PJM. Below is a summary of a selection of stakeholder comments to provide a perspective on various viewpoints regarding natural gas issues related to grid resilience.

RTOs/ISOs and Market Monitors

California Independent System Operator Corporation, ISO New England, Midcontinent Independent System Operator, Inc., New York Independent System Operator, Inc., and Southwest Power Pool, Inc. (Joint Commenters) requested that FERC decline to impose the PJM-identified proposals on other regions and instead allow individual RTOs/ISOs to pursue the resilience-related issues and initiatives that they have identified in their region through collaborative efforts with their stakeholders and pursuant to the timeframes they have established. Joint Commenters did not take a position on PJM's requested relief insofar as it relates solely to specific circumstances presented within PJM's region.

New York Independent System Operator, Inc. (NYISO) reiterated its request for FERC to permit NYISO to proceed with its ongoing collaboration with its stakeholders to develop and implement the necessary enhancements to address the challenges and opportunities presented by the continued transformation of the electric industry in New York. The NYISO noted that PJM, in its response to the Grid Resilience proceeding, unilaterally recommended that FERC impose certain near-term compliance obligations on all RTOs/ISOs; specifically, to submit a filing for any proposed market reforms and related compensation mechanisms to address resilience concerns within nine to twelve months from the issuance of a final order in this docket. The NYISO took no position on PJM's recommendation as it relates to PJM's markets. However, the NYISO stated that the recommendation is unwarranted for New York. The NYISO stated its shared governance process has a track record of success in addressing the challenges and opportunities facing the bulk power system and wholesale energy markets in New York. The NYISO highlighted its ability to work with its stakeholders to evolve and enhance its markets. The NYISO stated that the imposition of PJM's recommended approach on the NYISO would likely adversely impact the development of broadly supported market enhancements and increase the likelihood of otherwise avoidable litigation before FERC.

PJM Interconnection (PJM) stated that although some RTOs/ISOs believe no generic FERC action is appropriate, PJM believes that direction is appropriate as to FERC's overall approach to resilience. Specifically, PJM believes FERC should consider and provide guidance going forward on whether it envisions: (1) a holistic approach to some of the issues raised in this proceeding (which in some cases, such as planning, require potential modifications to FERC's Order No. 1000); or (2) a more reactive approach deferring solely to a patchwork of potentially differing initiatives in each region to address the larger topic of resilience. PJM also provided additional details regarding its fuel security initiative, stating that it anticipates completing its analysis in the next six months, and commencing a stakeholder process to further discuss the results of its analysis and any potential market rules changes with PJM.

stakeholders, including state and federal agencies as well as representatives from other industries, such as oil and natural gas. Additionally, PJM provided additional context regarding its gas-electric coordination comments, reiterating that while great progress has been made with the gas pipeline industry as to information sharing and communication protocols since the Polar Vortex of 2014, there remain certain regulatory issues, which could benefit from FERC providing certain regulatory certainty. PJM clarified that the majority of pipelines have interpreted Order No. 787 in the same way as PJM and have been open to communications without requiring posting of all information as a condition precedent to discussions among control rooms. PJM stated its recommendation concerning Order No. 787 is designed to provide additional regulatory clarity for those pipelines who still feel some exposure to claims of discrimination from invoking the “voluntary” provision of that order.

Southwest Power Pool Market Monitoring Unit (SPP MMU) stated that in addition to defining resilience, FERC should also engage in discussions to measure resilience to assess whether an area has attained resiliency. SPP MMU stated that a targeted objective must be measurable or quantitatively described so that achievement can be assessed and determined. Additionally, SPP MMU disagreed with PJM’s pricing formation proposal in that it would distort the fundamental principles of optimal pricing and dispatch. SPP MMU stated that PJM’s proposed price formation approach should not interfere with and disrupt the ongoing resiliency discussions.

State Regulators

Louisiana Public Service Commission and Mississippi Public Service Commission (together, Southern Commissions) stated that no additional FERC action is needed at this time to address grid resilience because there is no imminent grid resilience emergency and ISOs/RTOs, utilities, and state regulators are already taking the proper steps to ensure a resilient grid. Southern Commissions stated that each RTO/ISO, especially those operating in Louisiana and Mississippi, take grid resilience seriously by actively engaging in efforts, both internally, across seams, and with retail regulators, to improve the grid’s resilience for the future. Although the Southern Commissions welcome further grid resilience monitoring by FERC and believe that FERC should continue to encourage cooperation between retail regulators and RTOs/ISOs, no additional FERC intervention is necessary.

Michigan Public Service Commission (Michigan PSC) stated that although there is room for further progress, efforts to enhance resilience at the bulk power level will not achieve their desired end if state-regulated generation and distribution are not equally equipped to withstand a crisis. The Michigan PSC discussed in its comments how Michigan utilities have or will be submitting integrated resources plans and distribution plans to assess generation and distribution assets and prepare for investments. Further, the Michigan PSC discussed how Michigan either has or is developing the infrastructure and organization to ensure that electric providers have enough supply to serve their customers, that they carry their share of the planning reserves needed to serve the region, and that they have resources to harden their distribution system. The Michigan PSC stated that state regulatory authorities are best positioned to address resiliency at the local level, and recommended that FERC continue to respect these regulatory bodies’ expertise, while at the same time coordinating with them to prepare for and respond to crises. The Michigan PSC noted that open channels of communication and information sharing are critical to this coordinated effort. Further, Michigan PSC stated that given the overlap between grid reliability and grid resilience, FERC, RTOs/ISOs, and states should consider them together to avoid overlapping efforts and processes.

Missouri Joint Municipal Electric Utility Commission (MJMEUC) encouraged FERC to allow for the development of benchmarks, goals, and strategies that best fit the unique situation of each RTO/ISO and are developed through the unique stakeholder process of each RTO/ISO, including participation by state and local regulators. MJMEUC recommended that compliance with FERC’s standards and criteria should take into account the costs of compliance versus the benefits. MJMEUC stated that the standards and criteria should not be so rigid and rigorous that costs to end-use customers are increased comparable to the benefits to the grid and those customers. MJMEUC also provided comments specific to MISO’s response, including recommending that MISO: (1) maintain a focus on resilience using a holistic approach that recognizes the multitude of practices utilities perform that support resilience; (2) thoroughly

vet with stakeholders any modifications made to MISO's markets, planning or operating procedures to address resilience-related concerns; and (3) give preference to traditional resources that are most efficient and environmentally sound when determining which resources will be eligible to meet fuel diversity requirements and be eligible for grid resiliency credits. MJMEUC filed separate comments to address SPP's comments, suggesting among other things, that an examination of the SPP generation resource mix, its impact on system reliability and resilience, and the best way to accommodate a diverse mix of resources in SPP's wholesale markets warrants further discussion as part of a collaborative process among FERC, SPP, and its stakeholders. MJMEUC also raised a similar point regarding the recovery of resilience costs, recommending that the cost of accomplishing resilience should be carefully balanced with the benefits.

New York State Public Service Commission (NYPSC) requested that FERC continue monitoring issues regarding bulk system resilience, while preserving the NYISO's leadership role in addressing the New York Control Area system resilience. NYPSC also recommended that FERC consider convening a technical conference that facilitates the exchange of information and best practices regarding bulk system resilience.

North Dakota Public Service Commission (NDPSC) requested that FERC evaluate the extent to which baseload provides value to ensure that markets adequately compensate for its benefits. NDPSC stated that attributes such as inertia to maintain frequency, supplemental and operative reserves, voltage support, reactive power compensation, and other baseload benefits should be fairly compensated for the value provided to grid operations.

Pennsylvania Public Utility Commission (PAPUC) encouraged FERC to consider the responsibilities and obligations of the state commissions in its development of future grid resilience requirements imposed on RTOs/ISOs. Additionally, PAPUC suggested adoption of some, but not all, of PJM's recommendations to improve the resilience of the PJM grid. PAPUC raised concerns that some of PJM's proposed design, operational and market modifications may shortchange or bypass normal PJM stakeholder deliberative processes. PAPUC opposed PJM's suggestion that resilience attributes should be compensated; PAPUC does not endorse a further overlay of cost recovery for these specialized services or particularized attributes on "contributions to resiliency" which may result in overcompensation for these services. Further, while PAPUC is supportive of greater interagency cooperation and sharing of confidential data, it stated that FERC should also be cognizant of the potential for excessive RTO/ISO and member access to industry-specific information. Regarding PJM's gas-electric coordination recommendations, PAPUC stated that while some of PJM's 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. More specifically on the recommendation for greater coordination between pipelines and LDCs, PAPUC stated that it may merit further consideration but not purely in the context of resiliency planning.

Public Utilities Commission of the State of California (CPUC) stated that resiliency planning efforts must account for regional differences and unique planning requirements, and each region must have the needed flexibility to determine the actions best suited to maintain reliability and resilience. CPUC stated that California continues to aggressively plan for a changing climate to ensure Californians have safe, affordable, and reliable access to electricity, and has demonstrated these efforts through numerous ongoing proceedings. The CPUC discussed its state electric grid procurement planning mandates that require ongoing resource adequacy, as well as two-year integrated resource planning cycles. CPUC also discussed its recently instituted rulemaking to address adaptation to the impacts of climate change. CPUC stated it will continue to collaborate extensively with its partners at the CAISO and California Energy Commission to further explore and implement additional ways for the State to ensure a reliable retail and bulk power system.

Trade Associations

American Petroleum Institute (API) raised concerns that many of the initiative and proposed actions being outlined by various parties in the name of bulk power system resilience seem to be moving away from market-based solutions and in the direction of a command and control-type regime that have the effect of picking winners and losers outside of the competitive framework. Further, API raised concerns that PJM's requests related to FERC's engagement with the interstate natural gas pipeline industry are in some instances beyond FERC's jurisdiction, inconsistent with the manner in which the industry operates, and not supported by evidence. API noted that PJM does not cite a single provision in the Natural Gas Act that would give FERC authority to undertake the measures that PJM requests in its comments. API stated it sees no need for the additional mandates suggested by PJM regarding gas-electric coordination, tariff and transportation service reforms, and reforms to interconnection processes because most of the requests are occurring already without FERC mandates, or in some cases, involve areas where FERC has limited authority.

Electric Power Supply Association (EPSA) urged FERC to oversee the analysis and identification of resilience issues on a regional basis. EPSA also urged FERC to define resilience narrowly – focusing on maintaining and restoring service for customers during unexpected events – in order to allow for the clear identification of risks that are related to resilience, the system capabilities that can resolve them, and to delineate resilience from broader tenets of reliability or efficient market operation. Where resilience concerns demonstrably exist, EPSA stated the system operators should develop market reforms and improvements that ensure continued reliability and resilience of the system in each market. EPSA stated that competitive, fuel neutral market-based mechanisms are the correct tools to address any resilience risks or concerns. Regarding fuel security for generation resources, EPSA noted that improving coordination between electricity system operators and interdependent infrastructure systems should remain a priority as to emergency or scarcity period operations as well as the loss of third-party fuel delivery systems. While additional transparency may be necessary during these critical times, EPSA stated it must be coordinated not only between the ISO/RTO and third-party system, but also between the ISO/RTO and its market participant, the generator. As the ISO/RTO member providing the power to the system for delivery, EPSA stated that it is incumbent on the resource dispatch center to provide accurate, specific information.

Interstate Natural Gas Association of America (INGAA) stated that its members have worked collaboratively with the RTOs/ISOs towards the shared goal of electric and gas reliability and resilience, and that there is no need for additional, formalized processes or pipeline-specific proceedings, as PJM suggests in its comments. INGAA stated that the first step in analyzing the reliability and resilience of natural gas-fired generators must involve an examination of generator contracting practices. INGAA noted that interstate pipelines have demonstrated a willingness to develop services tailored to the needs of all customers, including gas-fired generators, that choose to purchase the service. INGAA stated that until PJM and other RTOs/ISOs analyze the extent to which generators within their individual footprints rely upon less than primary firm transportation service, it is impossible to determine what steps, if any, should be taken to address the increasing reliance on natural gas for electric generation. INGAA also stated that some of PJM's suggested reforms pertain to policies that have increased reliability and achieved FERC's stated goals, such as FERC Order No. 787. INGAA recommended that FERC reject PJM's unsupported request to review Order No. 787. Further, INGAA stated that other PJM suggestions involve requests for mandatory modeling of pipeline operations, without any showing that the current cooperation between pipelines and PJM has been lacking or that the modeling will result in informative results. INGAA stated that its members are willing to participate in tabletop exercises with RTOs/ISOs to increase gas-electric coordination, reliability and resilience. Regarding PJM's request that FERC direct pipelines to work with the RTOs to better synchronize their interconnection processes and sharing of analysis and results, INGAA stated that its members are willing to discuss with each RTO/ISO which areas on the pipeline system are more constrained than others, but the decision where to interconnect lies with the generator shipper. Finally, INGAA detailed its recent activities to improve the natural gas industry's security posture.

Natural Gas Supply Association (NGSA) stated that based on regional assessments filed in this proceeding, it is time to end discussions specifically directed at financially supporting uneconomic coal and nuclear plants in the name of resilience. NGSA stated that moving away from those discussions will allow FERC, RTOs/ISOs and their stakeholders to focus on the ability to reliably serve power customers. NGSA stated that power customers are best served by improving competitive market signals that provide for reliability and resilience in the most economic and fuel-neutral manner. Additionally, NGSA stated that several RTOs requested natural gas industry actions to support grid resilience given their increased reliance on natural gas but, as New England's fuel risk situation exemplifies, adequate infrastructure to support the region's power demand is the most vital natural gas industry component associated with reliability and resilience. Therefore, NGSA stated that refocusing the resilience conversation will also allow time for power market participants to examine ways in which they can become stronger advocates for infrastructure investments where such investments are needed to support system reliability and resilience. Further, NGSA recommended that FERC carefully consider the following principles as it reviews and considers actions proposed by ISOs/RTOs that relate to the natural gas industry: (1) strive to decrease, not increase, the level of regulation; (2) ensure the benefits of proposed actions outweigh the costs; (3) ensure concrete evidence is presented to support claims that a problem exists; (4) do not address isolated issues through federal regulatory requirements; (5) question instances in which only one ISO/RTO sees a need for prescriptive natural gas actions; (6) consider whether requested natural gas changes are issues that are more appropriately addressed by power market design changes; and (7) protect existing pipeline shippers from being adversely impacted. Finally, regarding the definition of resilience NGSA proposed the definition of resilience include a critical measure of resilience – the ability of the system to continue to reliably serve customers.

Member Companies

Avangrid, Inc. (Avangrid) stated that whatever actions or measures FERC may take should be supported by empirical data and analysis, and a causal connection be articulated between those facts and the proposed change. Avangrid stated that any attempt to develop a common understanding of resilience should account for the reliability-related activities of FERC and NERC, including those initiatives that may not have been afforded the label of resilience or reliability, but do in fact support those concepts. Further, Avangrid stated that any new proposal for the measurement of resilience must be shown to be reasonable and not preferential. Additionally, Avangrid stated that ISO-NE's responsive filing and its fuel-security analysis contain findings that require FERC's attention. Avangrid stated that the blueprints, tools, and materials with which to tackle the fuel-security risks in New England are available and ready to be put to work, and that FERC should determine how it could best help in this effort.

Berkshire Hathaway Energy Company (BHE) stated that although FERC has only recently begun investigating issues surrounding resilience, no new event has occurred to indicate a weakness in current planning processes or a problem that must be solved through mechanisms outside of the traditional manner in which FERC requests information and implements new requirements. BHE stated that FERC has a history of identifying issues to be resolved based on a fully-developed factual record, but no such record currently exists requiring immediate action on resilience at this time. BHE recommended against establishing NERC grid resilience standards absent a record of need and outside the traditional rulemaking process. Rather than developing new standards, BHE recommended that FERC encourage utilities to develop structured and sustainable approaches to resilience tailored for each utility's situation, in consultation with state regulators, regional transmission organizations, and other stakeholders. BHE stated that resilience is tied to numerous factors, and a holistic approach, considering the roles of generation, transmission, and distribution, is entirely appropriate. BHE stated that FERC properly noted that it should not start with the assumption that subsidies for certain generation units is a solution, and market solutions can be used to resolve grid resiliency concerns. BHE stated it will continue to work with its utilities and all stakeholders to identify and address issues related to resiliency as they arise, in furtherance of providing reliable power and just and reasonable rates.

Dominion Energy Services, Inc. (Dominion Energy) stated it is clear from the submissions by PJM and ISO-NE that efforts to improve resilience should target multiple aspects of the bulk power system, including market design changes, more sophisticated infrastructure planning, standards adoption and

other solutions. Dominion Energy highlighted the importance of fuel security, stating that a region should have a certain amount of resources with fuel on site and a diverse portfolio of generation resources utilizing different fuel sources. Dominion Energy supported the development of market design changes that will retain and attract the fuel security attributes that promote resilience of the bulk power system. Dominion Energy also supported state initiatives that seek to retain resources that provide fuel security and diversity, in addition to other resource attributes (such as zero carbon emissions) that are currently not valued by wholesale electric markets. Moreover, Dominion Energy recommended that FERC re-examine complications that surround the offering and dispatch of natural gas-fired resources during extreme weather events. Dominion Energy noted that while there have been market improvements, there is still a mismatch between the Day-ahead offer deadlines and the time period for next-day gas market trading activity. Regarding natural gas pipeline infrastructure, Dominion Energy noted a disconnect between the needs of the ISOs/RTOs to reliably operate their systems and the incentive for gas-fired generators to acquire the firm transportation service that may be needed to meet the variable needs of the ISO/RTO during times of system stress. Dominion Energy stated that if the value of firm and flexible natural gas transportation service was appropriately captured in the electric markets, these services will likely become more cost effective for the gas-fired generators to acquire, and market participants would develop ideal solutions for the circumstances of each region. Finally, Dominion Energy raised concerns about the PJM proposal to collect pipeline system data and to independently model operating “contingencies.”

Duke Energy Corporation (“Duke Energy”) stated that the concept of resiliency needs to be defined in a holistic manner, without bias toward technology or fuel. Further, Duke Energy stated that energy policies must balance resiliency with costs to customers, and that regional differences for resilience should be allowed in the RTOs/ISOs regions. Duke Energy also stated that any new requirements or rules generated in this docket should not be expanded to non-RTO/ISO regions, as the utilities in these regions are generally subject to integrated resource planning (IRP). Additionally, Duke Energy stated it does not support expanding this review to include gas-electric coordination and pipeline rules, as advocated by PJM, and does not believe the Grid Resilience proceeding should be expanded to include Transmission Loading Relief (TLR) reforms as proposed by the MISO.

Entergy Services, Inc. (Entergy Services) stated that the existing record demonstrates that the MISO system is resilient and that MISO appropriately acts to identify and address potential threats to resilience. Entergy Services stated that there is no need for a directive that MISO undertake additional resilience requirements, nor is there any record support to mandate MISO to make any further resilience filings. To the extent FERC determines that it must direct resilience-related changes to ISOs/RTOs or their markets, Entergy Services stated it is critical that it continue to account for regional differences and thereby allow regions and their stakeholders to identify resilience challenges and properly weigh the costs and benefits of potential solutions. Additionally, Entergy Services stated that FERC should carefully consider the extent of its jurisdiction to act on resilience issues; overly broad interpretations of FERC’s jurisdiction do not stand up to a careful reading of the Federal Power Act.

Eversource Energy Service Company (Eversource) agreed with FERC’s and ISO-NE’s general understanding of grid resilience, as well as ISO-NE’s assessment that in New England, the most significant resilience challenge is fuel security. Eversource also stated that while ISO-NE’s response illustrates the risk and regional trends toward further fuel-security challenges from an operational perspective, ISO-NE’s OFSA study may understate the magnitude and scope of the challenges. Eversource raised the concern that the study does not account for certain regional trends, such as state policy-driven mandates that support intermittent resources, which must be balanced with flexible, gas-fired generation. Moreover, Eversource stated that the study overstates the added security provided by the assumed market and operational mitigation measures studied by ISO-NE. Eversource recommended that FERC determine there is a need for further action in this docket to preserve grid resilience and reliability in New England. Eversource also recommended that action be quick, given the long lead time to develop and put into service the infrastructure needed to ensure regional fuel security and resilience. Additionally, Eversource suggested a New England-specific technical conference, as early as June 2018, on the region’s fuel security to determine what further action FERC should take to maintain regional grid resilience and reliability. Following the technical conference, Eversource recommended that FERC take

several actions to encourage the development of long-term, infrastructure-based grid resilience solutions. For example, Eversource recommended FERC consider how to address the inherent limitations on cost recovery between New England's wholesale electric and natural gas markets, which is a significant barrier to generators' willingness to fund gas infrastructure.

Exelon Corporation (Exelon) noted PJM's intent to conduct a study to perform targets analyses to identify fuel security risks that could affect specific locations on the system, including the deliverability logistics of fuel supplies during stressed conditions over time. Exelon supported the initiative, though recommended PJM also model and consider the environmental impacts of different approaches to ensuring resilience. Additionally, Exelon noted that PJM identified obstacles it faces in obtaining the information necessary to assess cyber and supply chain threats, and requested that FERC provide intelligence and metrics to apply to resilience vulnerability and threat analyses, such that they can then guide and anchor subsequent RTO planning, market design, and/or operation directives. To do this, Exelon first recommended that FERC direct PJM and other ISOs/RTOs to conduct studies on fuel security in their regions. Exelon recommended that PJM conduct a study like ISO-NE's OFSA study, but that it should focus on potential RTO vulnerability to gas pipeline disruptions, and assess the degree to which oil-fueled resources can support grid resilience. Second, Exelon stated that while PJM and other RTOs are studying fuel security in their regions, the federal government should develop a design-basis threat ("DBT") to identify resilience threats and provide a baseline against which PJM and other RTOs can measure their efforts at creating a resilient grid. Exelon stated that FERC, together with the Department of Energy, should lead the effort to develop a DBT, with input from the national security agencies, so that RTOs can ground their efforts to protect the grid in up-to-date and reliable threat information drawn from intelligence sources. Finally, Exelon recommended that FERC explicitly require ISOs/RTOs to consider resilience in their market design and transmission planning criteria, and propose any appropriate reforms for FERC's review and approval.

Louisville Gas and Electric Co. and Kentucky Utilities Co. (LKE) stated that while FERC has focused much of its attention within the current proceeding on evaluating the resilience of the bulk power system specifically in regions operated by RTOs and ISOs, LKE hopes that its comments – as an entity not in an ISO/RTO-operated region – can contribute to a more holistic understanding of the bulk power system resilience. Additionally, LKE stated that as FERC explores options to address resilience issues arising in the organized markets, it should take care that it does not preempt existing state processes that are working well nor undermine state jurisdictional prerogatives. Particularly when it comes to encouraging coordination between regions, LKE stated that FERC should be wary of potential principles or solutions that are overly prescriptive in imposing uniformity or standardization, and ensure that regional and local flexibility is preserved.

Madison Gas and Electric Company and WPPI Energy (collectively, Wisconsin TDUs) agreed with MISO's conclusion that there are no imminent resilience concerns in the region. As MISO moves forward, Wisconsin TDUs stated MISO must work collaboratively with stakeholders, including state and local regulators, to address any resilience issues and to evaluate the costs and benefits of potential resilience measures. Wisconsin TDU noted that MISO's resource adequacy programs are designed to complement the reliability mechanisms and authority of the MISO states. Wisconsin TDUs stated that the traditional resource planning model that dominates in MISO means that resilience measures crafted for other regions with mandatory capacity markets may not only be ineffective, but may undermine the MISO region's primary mechanisms for assuring adequate resources. Further, Wisconsin TDUs stated that PJM's request for generic action across all RTOs/ISOs should be rejected, as the record in this proceeding does not support imposing such requirements.

National Grid USA (National Grid) agreed with FERC that reliability and resiliency are closely related but separate concepts. National Grid stated that local and regional planning processes that focus on reliability needs alone are insufficient to fully address the threat of high impact, low frequency disruptive events. Further, National Grid stated that it would be beneficial for FERC to hold a technical conference this summer to foster a greater collective understanding of resilience issues. National Grid stated that such a forum would supplement the record needed to (1) create a uniform definition of, and principles around, the concept of resilience; (2) identify the types of high impact events that may threaten system

resilience (both physical and cyber), and (3) highlight the types of solutions that can increase the system's capability to avoid, absorb and recover from high impact events. Moreover, National Grid stated that a technical conference is necessary to focus on long-term system trends and the changing nature of system risks and vulnerabilities. Informed by this record, National Grid recommended that FERC direct RTOs/ISOs, in collaboration with regional stakeholders, to perform an assessment of the resilience of their bulk power systems, including the most pressing regional risks associated with high impact, low frequency events, and the types of region-specific solutions that may be necessary in transmission planning and wholesale market design to increase the resilience of the bulk power system. If the RTO's/ISO's assessment uncover gaps or inadequacies in the current processes, National Grid suggested that the RTOs/ISOs report and identify those issues to FERC in an informational filing. Finally, National Grid urged FERC to recognize the urgent threat to system resilience in New England posed by fuel security issues, and to take immediate action to address it. National Grid requested FERC convene a New England-specific technical conference to evaluate and recommend potential actions to support natural gas infrastructure development.

Northern Indiana Public Service Company (NIPSCO) stated that the United States does not need new regulations to enhance resilience as the energy industry has already been working on this issue in diagnosing recent major events. NIPSCO also stated that most innovation on the grid is occurring at the distribution level so FERC should continue working with state regulators to address resilience across the entire electric value chain. Additionally, NIPSCO stated that the resilience discussion should be broadened to leverage other energy systems, including the natural gas system. NIPSCO stated that a broader discussion, including how the interstate and local gas distribution company systems can supplement the electric system, has the potential to foster additional synergies, including potential economic advantages of understanding when the electric system can "lean" on the natural gas system and vice versa. At a minimum, NIPSCO stated that the interdependence on the grid of interstate pipelines for compression and the needs of gas-fired generators for system pressure and offtake must be considered as part of the resiliency discussion. Further, NIPSCO stated that the need persists for thermal resources, like natural gas-fired generation, to provide dispatchable ramping capability as intermittent resources become a larger percentage of the U.S. generation fleet.

Pacific Gas and Electric Company (PG&E) urged FERC to strive for precision to the extent that specific resilience protocols and policies are considered, either now in this docket or in other dockets in the future. Further, PG&E requested FERC, as it considers resilience in upcoming dockets: (1) keep in mind the risk of climate change when making decisions that could affect stakeholders' ability to make climate-smart investments, or to make other decisions to address climate resilience for the future; (2) continue to recognize the development and implementation of cybersecurity measures and protections as an important aspect of maintaining grid resilience; and (3) continue to recognize that access to reliable and resilient natural gas supplies and attendant transport capabilities are another important component of electric grid resilience in California. PG&E also encouraged FERC to acknowledge that regional considerations are important and that there is no "one size fits all" set of requirements or standards. Additionally, PG&E noted that increased grid resilience must be balanced with the additional costs necessary to achieve it and requested FERC take into consideration the cost-effectiveness of resilience measures, bearing in mind impacts on customer affordability.

PSEG Companies provided comments focused on PJM's filing. PSEG Companies stated that PJM proposed an overly narrow definition of resiliency, which fails to adequately capture the need to address low probability, high impact events that may affect the bulk electric system. Thus, PSEG Companies proposed an expanded version of FERC's resiliency definition that better recognizes the unpredictable frequency and impacts of the events the definition should encompass. Further, PSEG Companies generally agreed with PJM regarding the categories of high-impact, low-probability events that should be considered; however, PSEG Companies did not believe PJM accorded the proper degree of urgency towards certain resiliency threats that the PJM system faces. PSEG Companies stated the excessive reliance on gas-fired generation will expose PJM customers to potential disruptions in "just in time" gas supplies. Additionally, PSEG Companies stated that PJM failed to acknowledge the full scope of the national security issues that would be attendant upon the loss of the nuclear fleet. Moreover, PSEG Companies stated that PJM failed to perceive the urgent need for action, as PJM's nuclear fleet is an

irreplaceable asset. PSEG Companies requested FERC direct PJM to act quickly to address this problem. Regarding energy market design, PSEG Companies noted that PJM proposed a number of price formation reforms: improvements in operating reserves, better shortage pricing and pricing that reflects the units being dispatched. PSEG Companies supported PJM's efforts in these areas. Further, PSEG Companies stated that reforms and improvements with respect to the resiliency of the transmission system are also needed, including projects to replace aging infrastructure. Finally, PSEG Companies stated that compliance with NERC critical infrastructure protection (CIP) standards pose special challenges, and that steps must be taken to assure that compliance with the CIP requirements limits the availability of information appropriately.

Southern Company Services, Inc. (Southern Companies) stated that its primary recommendations are that FERC recommend that all regions have and maintain adequate resource diversity and ensure fuel security. Additionally, Southern Companies recommended that FERC work with the regions that are facing resource diversity and firm fuel supply issues, as well as other resiliency problems, and with the affected state commissions to develop appropriate solutions. From FERC's jurisdictional perspective, Southern Companies requested that FERC recommend that all regions have and maintain adequate resource diversity and ensure adequate firm fuel supply – all key attributes of a resilient electric system. Southern Companies stated that while resource selection and adequacy are largely state-regulated, FERC can take steps to better ensure that: state-regulated decisions aimed at promoting resource diversity, including the retention of sufficient baseload capacity, are incorporated and respected in wholesale markets; wholesale markets adequately compensate baseload generation for their contributions to electric system resiliency; and in order for natural gas generation to be treated as providing capacity on a long-term firm basis, it should have firm fuel supplies. Additionally, Southern Companies requested that FERC proceed with its efforts to facilitate the efficient siting of new natural gas pipelines. Further, Southern Companies stated that there are also actions FERC should refrain from taking because they would likely be counter-productive, such as imposing additional NERC reliability standard requirements in the name of resiliency outside of the existing standard development process. Southern Companies stated that the existing NERC standard development process provides adequate forum to address reliability issues, including resiliency-related reliability issues, that might arise in the future that affect resiliency.

Xcel Energy Services, Inc. (XES) stated that it does not view resilience as a discrete issue or initiative, but rather layering of various initiatives to drive delivery of safe and reliable services to customers. While XES does not see a role for FERC in electric or gas distribution system resilience, and does not perceive the need for new reliability standards, XES recognized that there are opportunities for FERC to play a greater role in the support of resilience. XES stated that FERC could: (1) enhance transmission investment by clarifying return on equity policies; (2) evaluate whether changes to planning standards are warranted to enable enhanced grid flexibility; (3) take action to improve interactions on the RTO seams; (4) adopt reforms to increase certainty in the interconnection queue; and (5) implement Public Utility Regulatory Policies Act (PURPA) reform. Additionally, regarding cyber security and cloud services, XES recommended that FERC and NERC work together to accelerate evaluation of opportunities to leverage the security capabilities that can be provided by private cloud service provisions. XES stated that such an evaluation would look at the opportunities presented by this capability, the risk compared to potential security gains, and the types of limitations and controls required. Regarding capacity market issues, XES raised concerns regarding efforts on the part of FERC to adjust energy market pricing mechanisms for all RTOs/ISOs to provide additional revenues to specific types of generation resources. Further, XES urged FERC to avoid attempting to expand capacity markets to areas beyond those in the RTOs/ISOs serving states that have undergone retail restructuring.

Other Stakeholders

BP Canada Energy Marketing Corp. and IGI Resources, Inc. (BP entities) stated that with evolving market fundamentals such as growing natural gas supply, technological advances and changing regional generation mixes, it is important to support competitive market structures. Additionally, the BP entities noted that strong coordination between the natural gas and electric industries is important for resilience and reliability. The BP entities recommended that FERC permit the individual RTO/ISO stakeholder

processes to craft solutions that address the unique needs of each RTO/ISO, and that FERC then act expeditiously to consider RTO-presented solutions. At the same time, the BP Entities suggested FERC instruct the RTOs/ISOs that any solutions must be market based and fuel neutral.

City of New York stated it has spent the last five years extensively studying the resiliency of its infrastructure and core systems, including the gas, electric, steam, water, and telecommunications infrastructure serving New York City. City stated that short-, medium-, and long-term actions were identified, and the City has worked closely with Consolidated Edison Company of New York, National Grid-New York to make their infrastructure more resilient. Additionally, the City responded to NYISO's comments, stating that notably absent from the filing was a discussion of the role an expanded transmission system could have in making the bulk power system in New York more resilient. The City disagreed with some aspects of NYISO's assessment of resiliency planning efforts, and requested that FERC require the NYISO to take a more holistic approach to resiliency planning, particularly regarding the inclusion of transmission. Further, the City requested FERC refrain from making generally applicable directives and from mandating a one-size-fits all approach to resiliency. The City stated that there are significant differences between the regions, and each RTO/ISO should be permitted to tailor its efforts to the resiliency issues that are pertinent to its control area.

Environmental Defense Fund (EDF) stated that FERC has an opportunity to further enhance resilience by taking the next step to advance gas-electric coordination: resolving the gap between pipelines and electric generators. EDF stated that the natural gas market rules have remained comparatively stagnant despite unprecedented change in the natural gas industry over the last decade. In the absence of FERC action to ensure that the gas market rules evolve with contemporaneous conditions, EDF stated that the market has found opaque workarounds to provide the flexibility generators require. For example, EDF discussed the lack of price formation and price discovery for non-ratable pipeline service, as well as for services provided by LDCs such as short-term pipeline capacity and/or bundled supply to generators. EDF stated that the market regulatory paradigm needs to be updated to accommodate electric generators. Without action to address the fundamental disconnect between interdependent market participants across both the gas and electricity markets, EDF stated that ISOs/RTOs and FERC will be left with a constrained set of tools to address fuel security, reliability, and resilience. Further, EDF stated that comments submitted by PJM, ISO-NE, and CAISO foreshadow fuel security and resilience challenges to come, if FERC does not advance opportunities to synchronize the natural gas market rules with the evolving needs of the electric market. EDF suggested FERC continue to advance markets as the impetus for new capacity by prompting pipelines and power generators to develop the transactional tools to support contracting. EDF stated this action could take various forms: (1) FERC could resolve the segment block at NAESB that prevented the Shaped Nomination standard and communication protocol from moving forward; (2) FERC could open a new docket, through a Notice of Inquiry or Notice of Proposed Rulemaking, to evaluate the need for gas market updates to reflect contemporaneous market conditions, assessing the value of voluntary shaped flow service. As part of its data gathering in that docket, FERC could request pipelines to provide all physical receipts and deliveries by the hour for the time period January 2017- January 2018; (3) FERC could invite participation in a voluntary pilot program and create a framework for pipelines to charge for shaped flow transactions; or (4) FERC could examine these issues on an individual pipeline basis, through targeted proceedings at FERC.

New England Local Distribution Companies (New England LDCs) urged FERC to take a coordinated approach to fuel security issues. The New England LDCs noted that several initiatives and proceedings have recently commenced which might impact fuel security issues, and recommended that FERC coordinate its rulings and directives in the proceedings which address these issues. The New England LDCs stated their primary interest is to seek to ensure the continued reliability of their firm natural gas transportation services in a very constrained environment, as ISO-NE relies more heavily on gas generation without adequate natural gas pipeline infrastructure. In addition to the options discussed in the ISO-NE response, the New England LDCs recommended the following: (1) FERC should focus on the critical fuel security issues in the New England region and support ISO-NE's efforts to work with its stakeholders to develop solutions to the issue; (2) given the concerns with inadequate natural gas pipeline infrastructure due at least in part to delays and challenges with the natural gas pipeline certificate process, FERC should consider expedited review of and decisions on new natural gas pipeline certificate

applications in critical fuel security regions; and (3) FERC should issue guidance, particularly with respect to fuel security, to ensure resilience and reliability for customers.

Public Interest Organizations stated that the RTO's/ISO's comments support a finding that there is wide variation in how to define "resilience" as applied to the BPS and how it differs from "reliability." The Public Interest Organizations stated that dividing initiatives clearly into either a "reliability" or "resilience" bucket is unnecessary to achieve a resilient and reliable grid. Rather, Public Interest Organizations recommended that FERC focus its attention on a strategy's result, i.e., will the action benefit electric customers? Additionally, the Public Interest Organizations stated that the RTOs'/ISOs' comments support resilience as part of their existing responsibility and that they are effective in evaluating procedures to ensure grid resilience. As such, Public Interest Organizations recommended that FERC resist imposing additional resilience requirements – which would manifest as higher customer costs – without evidence of need. Public Interest Organizations stated that the evidence shows that there is no crises of resilience and reliability today and no meaningful likelihood of one in the future. Public Interest Organizations recommended that FERC support policies and programs that either improve cross-regional communication and interconnection, advance gas-electric coordination, or improve the integration of clean energy technologies; this should be done with recognition that much of the most impactful resilience work needs to be done on systems outside of FERC's jurisdiction, particularly on the distribution system. The Public Interest Organizations noted that a recent DOE study found that 90 percent of electric power interruptions were on the distribution system.

Attorney Generals of Massachusetts, Rhode Island and Vermont (the Attorneys General) stated that FERC should not make recommendations nor draw conclusions related to the resilience of the New England bulk power system based solely or principally on ISO-NE's OFSA study. The Attorneys General stated that the OFSA's flawed factual assumptions and selective scenario modeling skew the results to show a future where the New England grid is more susceptible to fuel-security risks than it is when compared to stakeholder-requested scenarios. The Attorneys General stated that with sufficient time and opportunity, the current stakeholder process addressing near-term tariff-based approaches for reliability reviews, a review of the proactive programs that ISO-NE and stakeholders have developed together and implemented, as well as the broader discussion on resiliency and possible market-based changes, should bring into focus any factual future resilience concerns in a responsible and collaborative manner. The Attorneys General stated that any proposed reforms based on both the outcome of the stakeholder process and FERC's investigation, must be based on reliable data and a finding of need. Further, the Attorneys General stated that solutions must be market-based and made for the benefit of New England consumers while also considering a reasonable cost burden. Finally, the Attorneys General stated that any proposed solutions should be evaluated by conducting a full analysis of cost, benefits, and risks, including a customer bill impact analysis, that shows how consumers are affected and demonstrates that they would be better off under the proposed solution.

If you have any questions regarding this item, please feel free to contact me.