DrinkerBiddle&Reath LLP

C. Baird Brown
215-988-3338 Direct
215-988-2757 Fax
baird.brown@dbr.com

Christopher B. Berendt
202-230-542 Direct
202-842-465 Fax
Christopher.Berendt@dbr.com

Law Offices
1500 K Street, NW
Suite 1100
Washington, DC
20005-1209

202-842-8800
202-842-8465 fax
www.drinkerbiddle.com

CALIFORNIA
DELAWARE
ILLINOIS
NEW JERSEY
NEW YORK
PENNSYLVANIA
TEXAS
WASHINGTON D.C.

Established 1849

October 23, 2017

VIA FERC ELECTRONIC FILING SYSTEM

Federal Energy Regulatory Commission
Attn: eFiling Department
888 First Street, NE Washington, DC 20426

Dear Sir or Madame:

On behalf of the Microgrid Resources Coalition, enclosed please find comments in response to FERC's Notice of Proposed Rulemaking on Grid Reliability and Resilience Pricing, published October 10, 2017 in FERC Docket No. RM18-1-000, submitted pursuant to Rules 214 and 211 of the Rules of Practice and Procedure of the Federal Energy Regulatory Commission. The Microgrid Resources Coalition asks leave to intervene and be made a party to this docket in a separately filed motion to intervene.

Thank you for your attention to this matter.

Very truly yours,

C. Baird Brown
Attorney for the MRC

Christopher B. Berendt
Attorney for the MRC

CBB/BCP

Enclosures

Microgrid Resources Coalition

Comment on Notice of Proposed Rulemaking

[Docket No. RM18-1-000]

Grid Reliability and Resilience Pricing

Introduction

The Microgrid Resources Coalition ("MRC") welcomes the opportunity to provide comments on the DOE's proposed Grid Resiliency Pricing Rule (the "DOE NOPR" or "NOPR"). The MRC is a consortium of leading microgrid owners, operators, developers, suppliers, and investors formed to advance microgrids through advocacy for laws, regulations and tariffs that support their access to markets, compensate them for their services, and provide a level playing field for their deployment and operations. In pursuing this objective, the MRC intends to remain neutral as to the technology deployed in microgrids and the ownership of the assets that form a microgrid. The MRC's members are actively engaged in developing and operating advanced microgrids in many regions of the United States.[1]

[1] The MRC is actively engaged in advancing the understanding and implementation of microgrids across the country. MRC members hold significant energy assets connected to the electric grids, provide energy generation and supply services, and are exploring microgrid construction and ownership in different locations throughout the country. MRC members include: Anbaric Transmission, Concord Engineering Group, Eaton, ENGIE, ICETEC Energy Services, Inc., Massachusetts Institute of Technology, NRG Energy, Inc., Princeton University, and Thermo Systems. The MRC is affiliated with the International District Energy Association ("IDEA"), which connects members from all over the country operating combined heat and power plants and microgrids. This filing reflects the stance of the MRC as an organization and should not be construed to reflect of the positions of any individual member.

Microgrids[2] represent some of the grid's most resilient resources. Every day, microgrids make their communities more resilient by providing efficient, high performance energy services to local customers and wholesale markets while ensuring critical infrastructure remains powered.

As integrated demand and supply resource aggregations that can be managed as a unified resource, microgrids are inherently resilient. By operating as micro control areas islandable from the grid, microgrids provide intelligent load shedding, preserve the functionality of critical infrastructure and aid in grid restoration. In so doing, they project their resiliency onto their communities and the larger grid.[3] Microgrids often include distributed generation, storage and advanced building controls that can provide rapid substitution for grid supplied electricity and may also include a wide array of other capabilities such as the ability to transfer heating or cooling load from electric to thermal and back, the ability to use buildings themselves as thermal storage, the integration of electric vehicle batteries, and the ability to alter the time of use for many different types of loads. These combined capabilities are typically managed by sophisticated controls that permit the microgrid operator substantial ability to control its load / generation profile in detail, across a variety of factors relevant to the grid operator. The multiple energy delivery sources and proximity of generation to localized demand allow the microgrid to

---

[2] The MRC defines a microgrid as "a local electric system or combined electric and thermal system that: (1) includes retail load and the ability to provide energy and energy management services needed to meet a significant proportion of the included load on a non-emergency basis; (2) is capable of operating either in parallel or in isolation from the electrical grid; and (3) when operating in parallel, can provide some combination of energy, capacity, ancillary or related services to the grid." This language captures microgrids' ability to sell services to the larger grid and the opportunity for substantial efficiencies achieved through co-management of electric and thermal loads.

[3] They may include multiple metered loads and be served by more than one substation in normal operation, but are able to act as a single islanded micro control area. They are almost always served by a single transmission node.

provide highly efficient, reliable, and adaptable energy services. In addition, microgrids have the unique capability to serve their customers and critical infrastructure, but also assist the grid operator in restoration, by becoming an island in an emergency and by resuming parallel operation in concert with and at the convenience of the grid operator to help stabilize the restart of the system.[4]

The MRC is confident that many industry participants will address the assumptions and conclusions in the DOE NOPR that the MRC believes are not supported, either in the DOE NOPR itself or in the accompanying DOE Staff Report ("DOE Report"). We will confine our comments to how resiliency manifests, through microgrids and other advanced grid edge resources[5] and the transmission, distribution and market environments in which they operate. Although we do not directly respond to every question posed by the Commission in their October 4 request, we have noted below where our comments address issues presented by those questions.

Although it is cited in support of a NOPR addressing resiliency pricing, the DOE report does not attempt to define or discuss resilience. It contains a reasonably thorough discussion of reliability issues followed by a discussion of fuel diversity. It prefaces that discussion with this observation:

> Policymakers and regulators should recognize that fuel diversity is a poor proxy for valid policy objectives, like risk management and reliability. Specifically, a high level of fuel diversity does not

[4] For example, MRC member's microgrids have been able to help stabilize the grid in the wake of severe weather events such as hurricane Sandy.

[5] Grid edge resources are resources that are either behind a customer's meter or serve local groups of customers either in island mode, through a virtual metering arrangement, or through another form of community aggregation.

> necessarily mean that an electricity system manages risk efficiently or meets reliability needs. . . . Interventions to promote specific fuel types – such as bailouts for coal and nuclear or mandates or subsidies for renewables – skew investment risk and can undermine incentives for reliability-enhancing behavior. . . .[6]

It is disappointing that DOE has made a regulatory priority of an action that will have limited effect on grid resiliency and will, if implemented as apparently intended, substantially raise customer costs.[7] Further, while recognizing that technology specific interventions are inefficient, the NOPR focuses heavily on solid fuel storage technology. That focus equates resiliency with large generators that can continue to operate in a regional grid, rail / barge terminal system and/or pipeline emergency. However, resiliency is systemic, and addressing only one type of fuel storage misses much of the picture. Transmission and distribution system failure, inadequate localized generation resources, controls and maintenance have caused far more disruptions than the lack of available large generators.[8] Indeed, in most instances, the operability of large generation during a transmission outage is of little value until power can be delivered. If such generators do trip off in an outage, they take by far the longest to resume operation.

In thinking about resiliency, the DOE had at its disposal a far more thorough analysis of the nature and needs of grid resilience in the 2017 report prepared by the National Academy of Science, Engineering and Medicine: <u>Enhancing the Resilience of the Nation's Electricity</u>

---

[6] DOE Report at 91.
[7] The MRC assumes, in the absence of any specific proposal by DOE, that subsidized coal and nuclear units will run as base load as if they bid zero net of some maximum downtime. Any lesser run time will increase the cost per MWh to customers.
[8] Ironically, by sheer number of incidents, squirrels pose one of the greatest threats to the reliability of the grid. *See* http://cybersquirrel1.com/.

System (the "NAS Report").[9] The NAS Report looks to the future of the Nation's grid rather than attempting to resurrect the past at great cost. The grid of the future will achieve resilience by incorporating increasing quantities of local generation, linked by flexible and adaptable networked distribution, and coupled with intelligent load shedding to ride through emergencies.

The average age of coal fired power plants in the U.S. is 39 years,[10] and the average age of nuclear plants is 37 years.[11] Many of them have exceeded their original design life. Prudent investment on behalf of ratepayers would support progress toward a more resilient future, not band aids on the past. Investment by utilities in resilient infrastructure will support investment by customers in resilient microgrids and other grid edge resources that provide local generation and load management.[12]

Need For Reform

FERC Need for Reform Question 1: Defining Resiliency.

The MRC suggests a practical, foundational definition of "resiliency": the ability to preserve critical infrastructure and functions for communities and customers, adapt the grid rapidly to disruptions, and promptly restore service that is lost.[13] In the future, the aim is for a smart grid that is self-healing, flexible, competitive, efficient, visible and resilient. As a first priority, we respectfully suggest that strengthening the ability of grid edge resources to support

---

[9] National Academy of Science, Engineering and Medicine: Enhancing the Resilience of the Nation's Electricity System, 2017, available at https://www.nap.edu/catalog/24836/enhancing-the-resilience-of-the-nations-electricity-system. (hereinafter "NAS Report").

[10] *See*, U.S. Energy Information Administration, *Most Coal Plants in the United States Were Built Before 1990,* April 17, 2017, *available at* https://www.eia.gov/todayinenergy/detail.php?id=30812.

[11] *See*, U.S. Energy Information Administration, *Most U.S. Nuclear Power Plants Were Built Between 1970 and 1990,* April 27, 2017, *available at* https://www.eia.gov/todayinenergy/detail.php?id=30972.

[12] Docket No. RM18-1-000, FERC Request for Comments, *Need for Reform*, p. 1-2.

[13] This definition omits the aspects of reliability that involve hardening grid assets to avoid disruption in the first place. These actions are clearly important, but in the view of the MRC they are already the focus of extensive attention from the North American Energy Reliability Corporation, and, in any event, were treated separately in the DOE Report.

critical services, such as emergency responders and hospitals, under a variety of conditions, and support the larger grid when it is stressed, damaged, or failing, should be at the core of any definition of resiliency. When combined with reliable communications infrastructure and distributed control, this serves as the backbone for grid resilience. We respectfully suggest the Commission adopt this simple technology neutral definition of resiliency that is rooted in functionality of critical infrastructure and services for communities and customers but can scale to encompass the wider grid. We make this suggestion understanding its jurisdictional breath. Creating resilient power systems and communities will require collaboration among the Commission, NERC and state regulators as well as other federal and state agencies. The MRC recognizes that in past practice, neither federal nor state level regulators have typically differentiated critical infrastructure related load (beyond the normal rate and market participant classes). It is a challenge before all levels of government, but one well worth taking on.

Consistent with the suggested, locally focused definition of resiliency, we respectfully suggest the incorporation of the performance metrics discussed in the Eligibility section below as a measure of resiliency. Again, the use of this definition and performance metrics focused on critical infrastructure also supports the resiliency of the grid as a whole. Achieving local resiliency incrementally strengthens the grid by giving operators more flexibility – acting locally is the most effective way to achieve a global effect. Given the importance of essential services to the creation of real resiliency for our communities and the simultaneous benefit to the grid, we believe that they merit first order consideration.

Our definition of resiliency is closely aligned with the analysis of the NAS Report, which does not provide a definition of resiliency as such, but states:

> Resilience is not just about lessening the likelihood that outages will occur. It is also about limiting the scope of and impact of outages when they do occur, restoring power rapidly afterwards, and learning from the experience to better deal with events in the future.[14]

To borrow from the summary of the NAS Report:

- "Both human and technical systems must be designed before grid failure so that the responders can assess the extent of the failure and damage, dispatch resources effectively, and draw on established component inventories, supply chains, crews and communications channels."
- Enhancing system resilience includes: "improving the health of individual grid components . . . , improving system architecture to further reduce the criticality of individual components . . . , and considering the criticality of the grid's underlying cyber infrastructure."
- "[R]estoration processes are starkly different depending on the nature of the event. The keys to restoration are to envision a broad range of threats, work through future scenarios, plan, and rehearse."

[14] NAS report at 1. This is broadly consistent with components of resilience proposed by Argonne National Laboratory in its report "Resilience: Theory and Applications" prepared in collaboration with the Department of Homeland Security:

- Preparedness (anticipate)
- Mitigation measures (resist, absorb)
- Response capabilities (respond, adapt)
- Recovery mechanisms (recover)

The report is available at http://www.ipd.anl.gov/anlpubs/2012/02/72218.pdf.

In exploring grid challenges beyond reliability, the DOE NOPR imagines a single scenario – an event in which the gas delivery infrastructure is overtaxed or compromised on a widespread, long-term basis[15] at the same time that the transmission and distribution systems are still largely intact or quickly restored. It mentions the polar vortex and damage to the Aliso Canyon storage facility, which did not result in a loss of power. [16] It also invokes hurricanes without explaining why they support the policy conclusion. The experience of MRC members in this regard is instructive.

For example, widespread power outages during and after Hurricane Sandy caused significant damage to local infrastructure, the Princeton University's microgrid continued to function and provide electricity to the campus. This allowed the University to provide hot meals, hot showers and cell phone charging to emergency responders. In addition to the Princeton University microgrid, additional distributed energy resources in the region were able to remain online throughout Sandy, such as the NYU downtown campus cogeneration facility and interconnected buildings and the NRG Princeton Medical Center microgrid. In contrast, the power failure and eventual closing of the NYU Langone Medical Center in midtown Manhattan drew national attention and initiated a review of the center's energy infrastructure. The NYU Langone Medical Center has since built and installed an islandable cogeneration-based microgrid, along with additional back-up systems, which will allow the complex to be self-sufficient in the event of a utility power interruption.

[15] Delivery of wind, and solar "fuel" is intermittent but not subject to long-term interruption.

[16] Much work has been done and is ongoing to avoid repetition of these events. Among its many suggestions, the NAS Report recommends action by DOE (among others) to improve system resilience, including a recommendation for additional co-ordination between the electric and gas industry to guard against a collective mismatch of capabilities. NAS Report Recommendation 4.7 p. 82. In the MRC's view, designing the electric system for more intelligent generation/storage profiling and load shedding is likely to be preferable to designing the gas delivery system for combined electric and heating peak loads. Others will no doubt comment on local gas storage.

FERC Need for Reform Question 1: Valuing Resiliency.

In valuing resiliency in our overall grid system, the MRC believes the Commission needs to examine the strategies that will lead to a smarter grid that operates as a multi-directional cellular mesh. Again, noting the careful work of the NAS report, the following strategies will help move us toward the resilient grid of the future:

- Distribution systems resilience achieved through a networked system, smart metering and fiber optic communication.[17]
- Utility scale battery storage (though it fails to acknowledge the role of thermal storage in jointly managed thermal and electric systems).[18]
- Strategically placed distributed energy resources that are visible and controllable.[19]
- Improved inverter standards that allow renewable resources to provide ancillary services.[20]
- System architecture that reduces the criticality of individual components needed to maintain grid functionality.[21]
- Intelligent load shedding that permits reductions in load customer by customer rather than radial by radial while preserving essential functioning.[22]
- Adaptive islanding that permits individual microgrids and grid sub-regions to operate independently to reduce the impact of outages.[23]

---

[17] NAS Report at 74.
[18] NAS Report at 75.
[19] NAS Report at 76.
[20] NAS Report at 76-77; *See also*, UtilityDive, *California Solar Pilot Shows How Renewables Can Provide Grid Services*, October 16, 2017, *available at* http://www.utilitydive.com/news/california-solar-pilot-shows-how-renewables-can-provide-grid-services/506762/.
[21] NAS Report at 80.
[22] NAS Report at 81.

A networked system with smart metering can have the effect of substantially reducing system restoration costs, [24] and reducing the size of critical components can realize savings on the costs of reserves. Intelligent load shedding and islanding can substantially reduce the costs of disruptions for customers. Indeed, customers have many incentives to install and maintain microgrids – ranging from cost savings arising from co-management of thermal and electric load, to individual resilience, to carbon emissions reduction – and will invest in resources that provide benefits to the grid at lower costs than the grid can provide them. The MRC submits that the ability to receive fair value for services provided to the grid is crucial to supporting customer investment decisions.

Eligibility

FERC Eligibility Question 3: Technical Characteristics for Eligible Units

The MRC strongly supports paying fair value for services provided to the grid. Much of our advocacy is focused on allowing microgrids and other smart, visible grid edge resources to, *first*, participate in wholesale markets on an equal footing with other resources and, *second*, receive market value for those services. We have not supported approaches that sought to establish a "value of solar" or other technology specific payments.[25] Further, we agree with the NAS Report that resiliency must often be assessed in a local context. FERC has taken this approach with reliability must run contracts, but we concur with FERC that competitive markets are a better solution. The DOE has not made a credible attempt to "envision a broad range of threats, work through future scenarios and plan." We have no proposal for a resiliency product

[23] NAS Report at 81-82.
[24] NAS Report at 73-75.
[25] Microgrid Resources Coalition, *Comments on the National Association of Regulatory Utility Commissioners' Draft Manual on DER Compensation*, filed September 2, 2016, *available at* http://www.microgridresources.com/MRC-Action/State-Initiatives-Group.aspx

that coal and nuclear units jointly provide. While well maintained and operated base-load plants can contribute to system capacity, as described above, they make little contribution to resilience – they are large, dangerous to lose, and inflexible. In the MRC's view, the DOE NOPR does not define a service that merits serious consideration.

FERC Eligibility Question 3 and 5: Technical Characteristics and Services for Eligible Units; FERC Implementation Question 4: Performance Requirements

The MRC respectfully suggests to the Commission that technology-neutral performance metrics can form the basis of tariff frameworks in support of resiliency. The metrics set forth below are consistent with our suggested definition. Again, we suggest an initial focus on local critical infrastructure, but note the implementation of such metrics will serve as immediate, incremental building blocks toward the creation an overall more resilient grid.

- *Proximity of a supply resource to critical demand-side infrastructure*.

  If a supply resource is proximate to critical infrastructure-related load as most interruptions take the form of transmission and distribution outages rather than interruptions in fuel supply to generators. Supply resources located near critical infrastructure with distribution channels minimize the potential disruption points.
- *Hybrid generation and storage*.

  If the resource has multiple different units and/or generation types, operation as an aggregation, especially with hybrid generation, is inherently more robust and less at risk from a single point of failure. Hybrid storage, from thermal and electrical to fuel, should also be included in the performance metrics (there are numerous other options for onsite and local storage in addition to solid fuels, including gaseous and liquid, e.g. CNG storage at the LDC network / local level proximate to gas-fired generation resources).[26]

- *Fast start and black start capabilities.*

  If the multiple unit and/or hybrid generation aggregation proximate to critical infrastructure is able to fast start and black start allowing the supply resource to quickly respond to grid signals and conditions in order to support the proximate critical infrastructure.

- *Islanding capability*

  If supply resources and the critical infrastructure they are serving have the ability to island from the main grid system in an emergency allowing those resources to continue to support delivery of essential services to the community even in the event of a complete outage of the larger grid. It also permits the grid operator to shed load in emergencies without loss of critical services.

The MRC encourages FERC to consider using the resiliency performance measures above in developing products and markets (such as resilient capacity products and new enhanced capacity products) that reward the resources which actually make our communities more resilient and the grid more adaptable.

Implementation and Rates

FERC Implementation Question 3: Impacts; FERC Rates Questions 1-4.

The DOE NOPR places considerable emphasis on current concerns with price formation in the RTO administered wholesale markets. While attention to price formation is laudable, the

[26] A hybrid generation resource and different combinations of fuel, electric, and thermal storage creates a diversity in generation such that an outage or fuel supply is less likely to result in a complete shutdown of the unified / aggregated supply resource.

MRC believes that the NOPR discussion is completely misplaced as the proposed rule would exacerbate the problems. Current problems with price formation arise in large part from incentives on the part of many generators to underbid. Most of the attention has focused on state subsidies for nuclear power, which recognize its value as a low carbon asset, and to a lesser extent on subsidies for renewable generators that can encourage negative bidding under certain market conditions. However, the RTO energy markets were designed primarily to allocate the use of transmission system. Not only the resources listed above, but also resources with contracted output, often submit low or zero bids (as price-takers) to be scheduled knowing that their costs are covered. The proposed rule would prescriptively allocate transmission capacity to legacy resources, which would further dilute the bidding pool to the detriment of new entrants and, above all to the detriment of consumers. The capacity markets in three RTOs were adopted to recognize the "missing money" in the energy market and to meet the aggregate need for adequate resource levels. However, across the county many nuclear plants, though not subject to cost of service regulation, remain affiliated with distribution utilities and, accordingly, are limited in their ability to bid in these markets as price takers.[27] And, as the DOE report indicates, coal-fired power plants, although often held as merchant units, simply have struggled to compete on price in the world of low-priced natural gas.

The MRC understands that under the federal power act states have broad ability to plan for resource adequacy and to support generation with preferred characteristics. The Supreme Court's narrow ruling in *Talen v. Hughes* and subsequent decisions in lower courts confirm

[27] PJM, *PJM Capacity Market Manual 18*, Section 5.4.5 Minimum Offer Price Rule, Revision 38, effective July 27, 2017, *available at* http://www.pjm.com/-/media/documents/manuals/m18.ashx.

this.[28] Work is underway in PJM, NYISO and ISO New England to address the interaction of the federally regulated wholesale markets with state subsidies and resource standards. The proposed rule, by withdrawing nearly fifty percent of all generation from the wholesale markets (and apparently automatically making those generators must run units disregarding the detailed generator retirement and RMR agreements tariffs many RTOs have developed) would cripple the ability of the RTO markets to form accurate prices. [29] To the extent that subsidized coal and nuclear units provide ancillary services, it would introduce similar mispricing into ancillary services markets that hitherto have performed well. The wholesale markets are the one bright spot in the generally uneven playing field faced by microgrids and other grid edge resources. The proposed rule will crowd out investment in the grid of the future.

Conclusion

The MRC urges the Commission and DOE to take resiliency seriously and consider the suggested definition and performance metrics above as direct contributions to the resiliency of our communities and the larger grid. In doing so, the Commission should identify needed services and assure that those services are acquired in a cost effective manner, giving as much latitude as possible to equal competition that avoids exclusion or prescription of technologies. The Commission should devote its resources, and the resources of ratepayers, to the real work of achieving resiliency by supporting the grid of the future and recognizing the resources that are ensuring that our communities maintain essential services today.

---

[28] *Hughes v. Talen Energy Mtkg., LLC*, 136 S.Ct. 1288 (2016); *Allco Fin., Ltd. v. Klee*, 861 F.3d 82 (2d Cir. 2017); *Coal. for Competitive Elec. v. Zibelman*, No. 16-CV-8164 (VEC), 2017 U.S. Dist. LEXIS 116140 (S.D.N.Y. July 25, 2017).

[29] Others will no doubt comment more extensively, but the proposed rule is inadequate to specify payments to coal and nuclear plants. There is no ratemaking procedure, no prudence standard, and no definition of capital costs to be reimbursed. At a minimum, only undepreciated assets should be considered, and new investment to extend the lives of older plants (which makes their retirement post-mature) should be subject to a skeptical prudence review.