UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Essential Reliability Services and the Evolving Bulk-Power System—Primary Frequency Response	Docket No. RM16-6-000

COMMENTS OF THE AMERICAN PUBLIC POWER ASSOCIATION, LARGE PUBLIC POWER COUNCIL, AND TRANSMISSION ACCESS POLICY STUDY GROUP

On February 18, 2016, the Commission issued a Notice of Inquiry seeking comment on the need to take action to ensure the adequate provision of primary frequency response.[1] The American Public Power Association ("APPA"), the Large Public Power Council ("LPPC"), and the Transmission Access Policy Study Group ("TAPS") (collectively, the "Joint Commenters") appreciate the opportunity to respond to this important NOI.

The NOI rightly puts the spotlight on the growing concern that the changing generation mix is both increasing the need for, and reducing the capability to provide, primary frequency response. Joint Commenters note that the Commission has already taken several actions to begin addressing this concern.[2] Important among those actions was the approval of NERC Reliability Standard BAL-003-1, which establishes frequency response obligations for Balancing Authorities ("BA"), allowing each BA to assess the

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[1] Essential Reliability Services and the Evolving Bulk-Power System—Primary Frequency Response, 81 Fed. Reg. 9182 (Feb. 24, 2016) ("NOI").

[2] Third-Party Provision of Primary Frequency Response Service, Order No. 819, FERC Stats. & Regs. ¶ 31,375 (2015) ("Order No. 819"); Frequency Response and Frequency Bias Setting Reliability Standard, Order No. 794, 78 Fed. Reg. 3723 (Jan. 23, 2014), 146 FERC ¶ 61,024 (2014) ("Order No. 794"); *N. Am Elec. Reliability Corp.*, 146 FERC ¶ 61,025 (2014) (ERCOT Primary Frequency Response).

amount of primary frequency response available to it, and to develop appropriate solutions to ensure the BA (or Frequency Response Sharing Group) has enough frequency response to maintain system reliability on the interconnection.

BAL-003-1 is a very new reliability standard—the relevant requirement for BAs to ensure frequency response just became effective on April 1, 2016. The Commission has already recognized the need for further study of this new mechanism, and has directed NERC to submit a report in 2018 to assess the effectiveness of this standard in providing an adequate amount of frequency response.[3] That study process will better inform the need for further action to ensure adequate frequency response in each interconnection. The Commission should be measured in taking actions *prior* to the release of NERC's report.

Nevertheless, Joint Commenters believe that it would be appropriate to begin a rulemaking process to modify the *pro forma* Large Generator Interconnection Agreement ("LGIA") and Small Generator Interconnection Agreement ("SGIA") to require all *new* generators interconnecting under those agreements, including non-synchronous generators, to install primary frequency capability. This relatively low-cost action would limit any further reduction in frequency response capability, while further studies and data analysis are conducted. Taking such an immediate step will allow the Commission, NERC, and the industry to develop more experience with BAL-003-1 and continue evaluating the effectiveness of various mechanisms to address the primary frequency response issue.

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[3] Order No. 794, P 60.

On the other hand, it would be inappropriate to impose significant new obligations on *existing* generators at this time. Requiring existing generators to retrofit equipment to provide primary frequency response capability could be very costly. While we recognize that the changing generation mix may create future frequency response challenges, there does not appear to be any evidence that such a burdensome and costly change to the frequency response obligations of existing generators is now needed.

All generators with primary frequency response capability—both new and existing—should be encouraged to configure their equipment consistent with NERC's Primary Frequency Control Guideline, as applicable. But it would be inappropriate to make compliance with the Guideline into a mandatory requirement. Instead, NERC, working with the NERC Operating Committee, should take steps to monitor how many generators are configuring their governor deadband and droop settings consistently with the Guideline, and evaluate whether further action is needed.

Joint Commenters further urge the Commission not to impose a uniform requirement to compensate generators for the provision of primary frequency response. Individual BAs (including RTOs) may choose to compensate generators for providing primary frequency response most economically by using existing tools (such as purchasing frequency response from third parties at market-based rates) or by proposing tariff or other changes that would compensate generators for providing primary frequency response. Such solutions should be evaluated on a case-by-case basis.

Finally, in light of the growing importance of this issue, Joint Commenters urge the Commission to schedule one or more technical conferences to further assess issues related to primary frequency response in each of the three interconnections.

INTEREST OF JOINT COMMENTERS

APPA is the national service organization representing the interests of not-for-profit, publicly owned electric utilities throughout the United States. More than 2,000 public power systems provide over 14% of all kilowatt-hour sales to ultimate customers and serve over 48 million people, doing business in every state except Hawaii. Public power systems own approximately 10.3% of the total installed generating capacity in the United States. Approximately 264 APPA members are subject to compliance with NERC standards applicable to users, owners, and operators of the Bulk-Power System ("BPS").

LPPC is an association of the 25 largest state-owned and municipal utilities in the nation. LPPC members are located throughout the nation, both within and outside RTO boundaries. LPPC represents the larger, asset owning members of the public power sector.

TAPS is an association of transmission-dependent utilities ("TDUs") in more than 35 states, promoting open and non-discriminatory transmission access.[4] TAPS members have long recognized the importance of grid reliability. As TDUs, TAPS members are users of the BPS, highly reliant on the reliability of facilities owned and operated by others for the transmission service required to meet TAPS members' loads. In addition, many TAPS members participate in the development of and are subject to compliance with NERC reliability standards.

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[4] Duncan Kincheloe, Missouri Public Utility Alliance, chairs the TAPS Board. Jane Cirrincione, Northern California Power Agency, is TAPS Vice Chair. John Twitty is TAPS Executive Director.

Communications regarding these proceedings should be directed to:

Allen Mosher
Vice President, Policy Analysis
AMERICAN PUBLIC POWER ASSOCIATION
1875 Connecticut Ave., NW
Suite 1200
Washington, DC 20009-5715
Tel.: (202) 467-2900
Fax: (202) 467-2918
E-mail: amosher@publicpower.org

John Twitty, Executive Director
TRANSMISSION ACCESS POLICY STUDY GROUP
4203 E. Woodland St.
Springfield, MO 65809
Tel.: (417) 838-8576
E-mail: 835consulting@gmail.com

For APPA and TAPS:
Cynthia S. Bogorad
Latif M. Nurani
SPIEGEL & MCDIARMID LLP
1875 Eye Street, NW
Suite 700
Washington, DC 20006
Tel.: (202) 879-4000
Fax: (202) 393-2866
E-mail: cynthia.bogorad@spiegelmcd.com
latif.nurani@spiegelmcd.com

For LPPC:
Jonathan D. Schneider
STINSON LEONARD STREET LLP
1775 Pennsylvania Avenue NW, Suite 800
Washington, DC 20006
Tel.: (202) 728-3034
jonathan.schneider@stinsonleonard.com

COMMENTS

Joint Commenters have organized these comments to respond to certain of the questions posed in the NOI.

I. REVISIONS TO LGIA/SGIA FOR NEWLY INTERCONNECTING RESOURCES[5]

1. Should the pro forma *LGIA and SGIA be revised to include requirements for all newly interconnecting generating resources, including non-synchronous resources, to:*

1.1. Install the capability necessary to provide primary frequency response?

1.2. Ensure that prime mover governors (or equivalent frequency control devices) are enabled and set pursuant to NERC's Primary Frequency Control Guideline (i.e., droop characteristics not to exceed 5 percent, and dead band settings not to exceed ±0.036 Hz)?

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[5] NOI, P 45, Question 1.

1.3. Ensure that the MW response provided (when there is available headroom) in response to frequency deviations above or below the governor's dead band from 60 Hz is:

1.3.1. Sustained until system frequency returns to within the governor's dead band setting?

1.3.2. Provided without undue delay and responds in accordance with a specified droop parameter?

A. All newly interconnecting generating resources should be required to install the capability necessary to provide primary frequency response.

Joint Commenters support initiation of a rulemaking process to amend the *pro forma* LGIA and SGIA to require all new generators, including non-synchronous generators, to install primary frequency capability. This relatively low-cost action could be taken immediately to limit any further reduction in frequency response capability.

Primary frequency response capability should be a standard feature of all new generators. Just as all new cars come equipped with anti-lock brakes, all new generators should come equipped with frequency response capability as part of the "rules of the road." Unlike retrofitting existing generators to include primary frequency response capability, including such capability on new generators, including non-synchronous generators, is relatively low cost. We understand that this capability is almost always installed for synchronous generation, and that inclusion of this additional control for new non-synchronous generation (wind and solar) would likely add only nominal costs. The experience in PJM suggests that such a change would not be unduly burdensome on new generators.[6]

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[6] NOI, P 43.

Amending the *pro forma* LGIA and SGIA to require new generators to include frequency response capability before interconnecting to the grid is an effective, "no-regrets" way to prevent the erosion of the interconnection's collective frequency response capability as the resource mix evolves. Taking such an immediate step will allow the Commission, NERC, and the industry to develop more experience with BAL-003-1 and continue evaluating the effectiveness of various other mechanisms to address the primary frequency response issue.

B. Generators should be encouraged—but not yet required—to comply with NERC's Primary Frequency Control Guideline, and NERC should monitor and report.

Joint Commenters recognize that at the time of NERC's Industry Advisory in February 2015, many generators in the Eastern Interconnection were not configuring frequency control devices in a way that allows them to provide effective primary frequency response during frequency disturbances. But that Industry Advisory raised awareness of the issue, and we expect that the situation has improved. We are aware, anecdotally, that some generator owners have changed droop and deadband settings on their generators since the February 2015 Industry Advisory.

More recently, in December 2015, NERC's Operating Committee published its Primary Frequency Control Guideline ("Guideline").[7] The Guideline, however, is a work-in-progress and does not provide guidance on settings for all types of generators. For example, just last month, NERC's Operating Committee reported that the Guideline

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[7] NERC, Reliability Guideline: Primary Frequency Control, http://www.nerc.com/comm/OC/Reliability%20Guideline%20DL/Primary_Frequency_Control_DRAFT.pdf.

is being revised to add asynchronous resources.[8] Moreover, certain types of generators, such as nuclear units, may not be able to operate within the parameters set forth in the Guideline.

Further, the provision of frequency response by a particular generator may be affected by a range of factors (e.g., temperature limits, emissions, then-current operations (relative to maximum capacity)), as well as potential need for derating in the context of non-synchronous resources. These considerations support allowing BAs the flexibility to determine how best, and at least cost, to satisfy their frequency response obligations under BAL-003-1.

For all these reasons, Joint Commenters do not support making the Guideline, which was developed as a *guideline*, into a mandatory requirement at this time—either as a reliability standard or an amendment to the *pro forma* LGIA and SGIA. Nor do we support imposing any other performance requirement. The significant challenges of measuring performance add to the unreasonableness of considering enforceable performance requirements at this time.

However, generators that have primary frequency response capability should be encouraged to comply with the Guideline, as it evolves in the coming months and years. A requirement that NERC take steps to monitor and evaluate whether generators have configured their governor deadband and droop settings consistently with the Guideline will shine an important spotlight on the issue and serve as encouragement for BES generators to comply. Joint Commenters therefore would support a directive that NERC

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[8] NERC, Operating Committee Meeting Presentations 59 (Mar. 8-9, 2016), http://www.nerc.com/comm/OC/AgendasHighlightsMinutes/March_2016_OC_Meeting_Presentations.pdf.

include in its 2018 report on BAL-003-1 an assessment of the amount of BES generation that has configured its governor deadband and droop settings (or equivalent settings) in compliance with the Guideline. NERC analysis as to whether the settings identified in the Guideline are sufficient and necessary to support primary frequency response would also be helpful. We urge NERC to work with the NERC Operating Committee (particularly the Operating Committee's Resources Subcommittee) to develop and evaluate measures, including use of additional alerts, to allow NERC to assess the amount of generation providing frequency response and its sufficiency.

C. NERC has the tools to collect sufficient information to effectively monitor generators' compliance with the Guideline.

In order to effectively monitor and report on generators' compliance with the Guideline, NERC must be able to collect sufficient information. NERC already has effective tools to gather the relevant information from BES generators. Reliability Standard MOD-027-1 requires certain large generators to provide models and model parameters for their turbine/governor controls or other frequency controls to Transmission Planners. Thus, it will provide confirmation of the governor deadband and droop settings (or equivalent settings). NERC can request that aggregated information from the Transmission Planners to evaluate generator compliance with the Guideline.

Although MOD-027-1 only applies to about 80% of BES generation,[9] the Commission has found that the limited applicability of that standard is appropriate for a continent-wide standard.[10] Similarly, for the purposes of assessing compliance with the

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[9] Generator Verification Reliability Standards, Order No. 796, 79 Fed. Reg. 17,011, 17,015 (Mar. 27, 2014), 146 FERC ¶ 61,213, P 29 (2014).

[10] *Id.* P 37.

Guideline, it is likely sufficient to monitor only those generators that are subject to MOD-027-1. If NERC believes that it needs additional information, such as governor modelling data from smaller BES generators, it has the ability to issue industry alerts and issue data requests to NERC registered entities to collect that information.

II. PRIMARY FREQUENCY RESPONSE CAPABILITY REQUIREMENTS FOR EXISTING GENERATORS[11]

1. *Should the Commission implement primary frequency response requirements for existing resources, as discussed above for new generators? If so, what is an appropriate means of doing so (e.g., changes to transmission provider tariffs or improvements to existing reliability standards)? How would transmission providers ensure that existing resources adhere to new primary frequency response requirements?*

A. Existing generators should not be required to retrofit equipment to provide primary frequency response capability.

Joint Commenters oppose any requirement at this time—either through a new reliability standard or through transmission provider tariffs—for existing resources to install primary frequency response capability. The Commission should gather more information and confirm that such a requirement is necessary to protect reliability before considering the imposition of such a costly requirement.

The cost of retrofitting existing generators to provide frequency response capability would be significant. As discussed above, such capability could be included in new non-synchronous resources as a control design revision that only nominally increases the total installed cost. In contrast, it can be quite expensive to install site controller and communications for older generation units that lack a site controller.

As recognized in the NOI (P 18), almost all existing synchronous resources and some existing non-synchronous resources already have frequency response capability.

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[11] NOI, P 52, Question 1.

So the marginal benefits and costs of generically requiring the retrofit of existing generation that lack the capability needs to be carefully assessed.[12]

Current information does not demonstrate a need to impose the high costs of retrofitting existing generation with primary frequency capability. As the NOI summarizes (PP 5-20), frequency response concerns are driven by future changes to our resource mix. Significantly, as described in the NOI (P 20), "NERC's State of Reliability Report for 2015 explained that the three U.S. Interconnections currently exhibit stable frequency response performance above their Interconnection Frequency Response Obligations," although it noted a decline. As reported in the NOI (P 17), the recommendations of NERC's Essential Reliability Services Task Force Measures Report (at vi) focused on ensuring that primary frequency capabilities are present in new generators to address the future generation resource mix. Unless additional information is developed that demonstrates a strong need for all existing generation to have primary frequency response capability, with benefits justifying the high cost of such action, imposing such a requirement on existing generators would be unnecessarily burdensome and unduly costly.

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[12] We note that as of year-end 2014, EIA Forms 860 and 861 show that utility and IPP wind (65,217.6 MW) and solar (10,196.3 MW) generating capacity constitute only about 7% of total utility and IPP capacity of 1,137,339.2 MW. Even assuming a major portion of such wind and solar generation lacks frequency response capability, conventional frequency responsive generation will remain the dominant source of generation in most areas. A prospective requirement for new generation to have frequency response capabilities will mitigate the risk created by the potential retirement of existing frequency responsive fossil-fired generation.

III. REQUIREMENT FOR EXISTING GENERATORS TO COMPLY WITH NERC'S PRIMARY FREQUENCY CONTROL GUIDELINE[13]

2. *As noted above, some existing generating units set dead bands wider than those recommended by NERC's Primary Frequency Control Guideline, and some units have control settings set in a manner that results in the premature withdrawal of primary frequency response. Should the Commission prohibit these practices? If so, by what means?*

A. Existing generators should be encouraged, though not required, to comply with NERC's Primary Frequency Control Guideline.

Joint Commenters do not support a requirement—either through a reliability standard or tariff provisions—to configure existing generators in accordance with NERC's Guideline at this time. As discussed in Sections I.B and I.C above, all generators—new and existing—that have primary frequency response capability should be encouraged, but not required, to comply with the Guideline. Further monitoring and reporting will inform whether further requirements are necessary and whether changes to the Guideline are appropriate.

IV. REQUIREMENT FOR GENERATORS TO PROVIDE PRIMARY FREQUENCY RESPONSE[14]

1. *Should all resources be required to provide minimum levels of: (1) Primary frequency response capability; and (2) primary frequency response performance in real-time?*

A. A requirement for all generators to provide minimum levels of primary frequency response capability or performance is unwarranted at this time.

As discussed in Sections I.A and II.A above, it would be prudent to include in the LGIA and SGIA a requirement that all newly interconnecting generators install primary frequency response capability, but there is no justification at this time to require existing

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[13] NOI, P 52, Question 2.

[14] NOI, P 54, Question 1.

generators to undertake the costly and burdensome step of installing such capability. As further discussed in Sections I.B and I.C above, it is also premature to impose any specific requirement for deadband or droop settings consistent with the Guideline.

It would also be premature to require all generators to provide a minimum level of primary frequency response performance at this time. First, as discussed in Section II.A above, not all generators have the capability nor should they be required to retrofit at this time. It would be therefore inappropriate to impose a performance requirement on all generators. Second, a minimum performance requirement applicable to generators with primary frequency response capability has not been shown necessary or appropriate at this time for the reasons discussed in Section I.B above. Third, the significant challenges of measuring performance add to the unreasonableness of considering enforceable performance requirements at this time. The Guideline recognizes that multiple methods of performance measurement exist, that performance verification "can be time consuming and requires subject matter expertise," and that any one of several factors "can reduce the confidence in or totally invalidate the performance sample."[15]

[15] Guideline at 10, 12.

V. COMPENSATION MECHANISMS FOR PRIMARY FREQUENCY RESPONSE[16]

The Commission seeks information on whether there is a need to establish or modify procurement and compensation mechanisms for primary frequency response, and whether these mechanisms will ensure that the resulting rates are just and reasonable.

A. Imposing generic changes to compensate generators for the provision of primary frequency response is premature.

Joint Commenters see no need for the Commission to take generic action to establish or modify procurement and compensation mechanisms for primary frequency response at this time. We do not have enough information to determine whether changes to existing compensation mechanisms are warranted.

As noted above, because BAL-003-1 has just become effective, we have no experience to assess the sufficiency of the tools now available to BAs to secure frequency response, and associated compensation mechanisms. As noted in the NOI, the Commission has taken a number of steps to facilitate the provision of and compensation for frequency response; most recently, it issued Order No. 819, authorizing market-based rate sales of frequency response by any sellers with market-based rate authority for energy and capacity. *See* NOI, P 36. In addition, as the NOI recounts (PP 31-34), the Commission has approved a number of regional approaches to the provision of frequency response. As various BAs and Frequency Response Sharing Groups gain experience complying with BAL-003-1, they will have opportunity to assess the sufficiency of the frequency response available to them, to take advantage of Order No. 819 and other existing procurement mechanisms, or propose others that are appropriate to achieving a

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[16] NOI, P 54.

least-cost means of meeting frequency response obligations in a particular region. The Commission can assess any such proposal on a case-by-case basis.

Thus, now is *not* the time to take generic action imposing uniform procurement and compensation mechanisms for frequency response. Rather experience with BAL-003-1 will inform whether further compensation mechanisms are needed.

VI. ALLOWING BALANCING AUTHORITIES TO IDENTIFY AND PROCURE PRIMARY FREQUENCY RESPONSE[17]

2. *Is it necessary for every generating resource to install the capability necessary to provide primary frequency response? Or is it more appropriate for balancing authorities to identify and procure the amount of primary frequency response service that they need to meet their obligations under Reliability Standard BAL-003-1 and the optimum mix of resources to meet that need?*

A. Individual Balancing Authorities should identify and procure primary frequency response service as needed to comply with BAL-003-1.

As discussed in Section II.A above, it is unnecessary to require every generating resource to install the capability necessary to provide primary frequency response. Rather, it would be far more cost-effective to allow BAs to identify and procure the amount of primary frequency response service that they need to meet their obligations under Reliability Standard BAL-003-1 at least cost and the optimum mix of resources to meet that need.

As discussed in Section V.A above, BAs already have tools to procure primary frequency response service, including purchasing that service from third parties at market-based rates. To the extent a BA believes it needs additional tools to procure

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[17] NOI, P 54, Question 2.

sufficient primary frequency response service, appropriate changes can be proposed and evaluated on a case-by-case basis.[18]

VII. INTERCONNECTION-WIDE OPTIMIZATION[19]

2.6 Please discuss the viability of implementing an Interconnection-wide optimization mechanism.

A. An interconnection-wide optimization mechanism would be infeasible.

Joint Commenters do not support an interconnection-wide optimization mechanism for procuring primary frequency response. There is no need to create new organizations or mechanisms intended to operate in conjunction with the mix of existing market structures (both organized and traditional) currently used in the Eastern and Western Interconnections to implement an entirely new interconnection-wide optimization of frequency response. Attempting to optimize frequency response on an interconnection-wide basis would pose significant coordination problems among the various BAs in an interconnection. Directing creation of an interconnection-wide organization to direct individual BAs and RTOs as to how to dispatch resources so that the provision of frequency response can be optimized is not a viable option from a practical or jurisdictional standard. Nor would it be consistent with the Commission's long-standing policy in favor of voluntary RTOs.[20]

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[18] For example, an RTO may consider and propose a mechanism similar to those used to procure blackstart capability. *See, e.g.,* MISO FERC Electric Tariff, Schedule 33, Blackstart Service, https://www.misoenergy.org/_layouts/MISO/ECM/Download.aspx?ID=19247.

[19] NOI, P 54, Question 2.6.

[20] *Duke Energy Ohio, Inc.,* 133 FERC ¶ 61,058, P 47 (2010), *reh'g denied*, 134 FERC ¶ 61,235 (2011).

REQUEST FOR TECHNICAL CONFERENCE

Joint Commenters request that the Commission convene one or more technical conferences to further study issues related to primary frequency response in each of the interconnections. Technical conferences will allow the Commission and stakeholders to become better informed about the scope of the frequency response issues in each interconnection, actions that have been taken or that will be taken to address the provision of frequency response, and assess differences among regions. Such conferences, and follow-up comments submitted in response to the information provided at the conferences, will better enable the Commission to assess whether and what additional actions are appropriate at this time.

CONCLUSION

The Commission should consider these comments as it evaluates the need to take action to ensure the adequate provision of primary frequency response.

Respectfully submitted,

/s/ Cynthia S. Bogorad

Jonathan D. Schneider
Jonathan P. Trotta
STINSON LEONARD STREET LLP
1775 Pennsylvania Avenue, NW
Suite 800
Washington, DC 20006
(202) 785-9100

Attorneys for the
Large Public Power Council

Cynthia S. Bogorad
Latif M. Nurani
SPIEGEL & MCDIARMID
1875 Eye Street, NW
Suite 700
Washington, DC 20006
(202) 879-4000

Attorneys for American Power Association, National Rural Electric Cooperative Association and the Transmission Access Policy Study Group

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