

**UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION**

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| Essential Reliability Services and the Evolving Bulk Power System— Primary Frequency Response |))) | Docket No. RM16-6-000 FERC-2016-1609 |
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COMMENTS OF PUBLIC INTEREST ORGANIZATIONS

I. COMMUNICATIONS

Please direct all communications concerning these comments to:

Casey Roberts
Sierra Club
1536 Wynkoop St., Suite 312
Denver, CO 80202
casey.roberts@sierraclub.org

Jennifer Chen
Sustainable FERC Project
1152 15th St NW, Suite 300
Washington, DC 20005
chen.fercproject@gmail.com

II. COMMENTS

The undersigned Public Interest Organizations (PIO) appreciate the opportunity to comment on this Notice of Proposed Rulemaking regarding primary frequency response.¹ As environmental, energy and consumer-focused advocates, we recognize the importance of primary frequency response in maintaining grid stability and reliability. We favor rules for ancillary services that recognize and harness the capabilities of a diverse set of generating, demand-side, and storage resources, which will ensure the lowest possible cost for obtaining these resources. Many of the organizations signing on to these comments also participated in FERC’s Notice of Inquiry last fall and are encouraged to see that several of FERC’s proposed changes are consistent with our suggestions.

¹ 157 FERC ¶ 61,122, Essential Reliability Services and the Evolving Bulk-Power System—Primary Frequency Response (issued November 17, 2016) (hereinafter “NOPR”). Published in the Federal Register on November 25, 2016 at 81 Fed. Reg. 85,176. Citations in these comments are to the paragraphs of the FERC-paginated document.

Because NERC’s most recent evaluation indicates that there is adequate primary frequency response (“PFR”) performance in all interconnections, there is time for FERC to take a measured or phased approach. We believe that the Commission’s current proposal to require limited PFR performance by all new generators is an appropriate interim step. However, in the long term we believe the Commission should explore measures other than mandates to ensure compliance with NERC Reliability Standard BAL-003-1.1 such as encouraging competitive procurement of fast-acting demand response from storage and demand-side resources as well as generators, and removing disincentives to providing this service.

A. Summary of the Proposed Rule

In this rulemaking, FERC proposes to require all newly interconnecting generating facilities “to install and enable primary frequency response capability as a condition of interconnection” through revisions to the *pro forma* Large Generator Interconnection Agreement (LGIA) and *pro forma* Small Generator Interconnection Agreement (SGIA).² These revisions will establish operating requirements for this primary frequency response capability, including maximum droop and deadband parameters, which control how quickly and for how long a generator responds to underfrequency or overfrequency events. FERC will not apply these requirements to facilities regulated by the Nuclear Regulatory Commission, nor will FERC require generators to maintain headroom (i.e., operate below their maximum output) in order to respond to underfrequency events.³ Generators will not be compensated for the cost of complying with any of the new requirements. The Commission seeks comment on these particular proposals and whether they are sufficient to ensure adequate levels of PFR.

B. Proposed Revisions to the Generator Interconnection Agreements

The Commission seeks comment on its proposal to revise the *pro forma* LGIA and SGIA to include requirements for all newly interconnecting generating resources to: (1) install the capability necessary to provide primary frequency response; (2) ensure that governors are enabled and configured consistent with NERC’s Primary Frequency Control Guidelines for droop and deadband settings; and (3) require specific duration and immediacy of frequency response. The Commission opted not to

² NOPR P 1.

³ FERC defines headroom as “the difference between the current operating point of a generator and its maximum operating capability, and represents the potential amount of additional energy that can be provided by the generating facility in real-time.” NOPR P 13, n.27

mandate frequency response capability or performance from existing resources, a decision that PIOs support.

The proposal to require frequency response capability on all new generation is consistent with the recommendation of a NERC Task Force that “[a]ll new resources should have the capability to support voltage and frequency.”⁴ PIOs agree that requiring all new generation to have frequency response capability is one step to ensure that as the generation fleet evolves to include a higher percentage of nonsynchronous resources like wind and solar, a sufficient portion of the overall fleet has the capability to provide frequency response.⁵ As noted by several other commenters, the capability to provide frequency response service is already integral to most modern inverters and a subgroup of IEEE has signaled its intention to include frequency response capability as part of the next standard for distributed energy resource inverters. Overall however, the Commission’s discussion of the economic impact on small generators of installing frequency response capability is limited and the cited evidence does not directly support the Commission’s conclusion that “small generating facilities are capable of installing and enabling governors at low cost in a manner comparable to large generating facilities.”⁶ SolarCity Corporation, a developer of distributed energy resources including small solar systems, expressed concern that a “requirement that all generators have frequency response capability may cost more for some resources, including certain behind-the-meter and distributed energy resources. The requirement would not be economically efficient in that all generators, regardless of costs, would be required to have frequency response capability.”⁷ PIOs therefore encourage the Commission to further investigate the cost for small renewable energy generators to install frequency response capability before making the proposed revisions to the SGIA. As the Commission notes, inconsistencies between the LGIA and SGIA may be justified on economic or technical grounds.⁸

PIOs also note concerns raised in comments filed by SolarCity Corporation that already-installed behind-the-meter and distributed energy resources could become subject to the SGIA should the owners of those resources opt to participate in wholesale energy markets.⁹ Because DER participation in wholesale markets is an emerging issue, PIOs suggest that the Commission may want to clarify the

⁴ NERC, Essential Reliability Services Task Force Measures Framework Report, at vi.

⁵ Widespread installation of PFR capability will support more robust participation in any ancillary service markets that may be established.

⁶ NOPR P 41.

⁷ SolarCity Corporation Comments, RM16-6-000 (Notice of Inquiry), at 4.

⁸ *Id.* The record does show that the cost to install PFR capability on new wind generating resources is relatively small, and a mandate to install this capability may drive down costs even further. *See* Comments of the American Wind Energy Association, RM16-6-000 (Notice of Inquiry), at 13.

⁹ SolarCity Corporation Comments, at 3, 5.

circumstances in which such participation would trigger requirements in the SGIA. Unless warranted by a significant shortfall of primary frequency response service, requiring the retrofit of existing generators for PFR capability under such circumstances would not be cost-effective.

The Commission's proposed revisions to the LGIA and SGIA will not only require frequency response capability to be installed, but also operated according to specific parameters. In other words, the LGIA and SGIA will require generators to provide frequency response service. The parameters proposed by the Commission are consistent with the voluntary Primary Frequency Control Guideline established by NERC to address the issue of existing generators using deadbands or governor control settings that inhibit the provision of frequency response service.¹⁰ Various individual transmission providers already mandate similar settings for all generators or require PFR capability for new interconnections.¹¹

PIOs share the view expressed by numerous other parties in the Notice of Inquiry phase that market-based procurement of frequency response service (in regions of the country with organized markets) would better ensure that the right amount and quality of PFR service is available at a lower cost to consumers.¹² Although the Commission has proposed to require new generators to provide frequency response service, it has not expressed any theoretical or practical disagreement with the general arguments in favor of market mechanisms for procuring this ancillary service, and PIOs hope that the Commission will continue to consider whether competitive procurement of frequency response—from load and storage resources as well as generators—would facilitate compliance with Reliability Standard BAL-003-1.1 at a lower cost.

While PIOs have reservations about whether it is necessary to require new generators to provide PFR service, the Commission's decision not to require generators to maintain headroom in order to provide this service substantially addresses our concerns about the most significant adverse impacts of a mandate. Wind and solar generating resources typically operate at their maximum available output due to their extremely low operating costs, and to require these resources to curtail around the clock, so as to be available for rare underfrequency events, would increase the cost of energy for consumers. The Commission's clarification that generators need not maintain headroom is just and reasonable as it will avoid significant opportunity costs associated with artificial curtailment of low-marginal-cost resources.

¹⁰ NOPR P 16.

¹¹ *See id.* PP 18-20.

¹² *See id.* PP 33-34. Frequency response is an interconnection-wide service and therefore, absent local resource constraints, this service could be provided by resources, including storage and load, located anywhere in the interconnection.

Should availability of upward frequency response become a problem in any particular interconnection, the affected balancing authorities could investigate the least cost steps to obtain that service, which may well involve leveraging the fast-acting responsive capabilities of demand-side and storage resources.¹³

C. Additional Measures Needed to Ensure Adequate Primary Frequency Response Service

The Commission also seeks comment on whether additional measures are needed to ensure adequate primary frequency response service.¹⁴ As the Commission notes, “the three U.S. Interconnections currently exhibit adequate frequency response performance above their Interconnection Frequency Response Obligations,”¹⁵ despite recent declines in the availability of this resource.¹⁶ Given that all three interconnections currently demonstrate adequate frequency response performance, and given the new requirement that new generators must provide this service, PIOs do not believe that any other immediate steps are needed.

Nevertheless, PIOs encourage the Commission to continue to seek stakeholder input on other tools to incentivize frequency response service. First, the Commission should address the shortfall of frequency response service from existing synchronous generators by ensuring that any disincentives to providing this service are removed to the greatest extent possible.¹⁷ Second, the Commission should support the development of mechanisms to competitively procure frequency response service from all grid-connected resources.

As NERC and the Commission have observed, for “many conventional steam plants, deadband settings exceed a ± 0.036 Hz dead band, resulting in primary frequency response that is not sustained, and . . . the vast majority of the gas turbine fleet is not frequency responsive.”¹⁸ NERC has established a voluntary Primary Frequency Control Guideline to encourage existing generators with disabled

¹³ Other than supporting the Commission’s position regarding headroom, PIOs do not take a position on the specific parameters FERC has proposed, other than to note that they are consistent with NERC recommendations, and many of the existing mandates imposed by particular grid operators.

¹⁴ NOPR P 57.

¹⁵ *Id.* P 9.

¹⁶ NERC State of Reliability Report 2015, at 9 (May 2015), available at <http://www.nerc.com/pa/RAPA/PA/Performance%20Analysis%20DL/2015%20State%20of%20Reliability.pdf>.

¹⁷ The Commission also “seeks comment on whether additional primary frequency response performance or capability requirements for existing resources are needed.” As stated in PIOs’ comments on the Notice of Inquiry, we do not believe that mandating frequency response service from all existing resources is cost-effective based on current information. To the extent that FERC acts regarding existing resources, we think that examining possible disincentives for providing this resource and encouraging competitive procurement from all grid-connected resources are appropriate steps at this time.

¹⁸ NOPR P 38, fn. 113.

frequency response capability to provide this service. FERC can support this effort by investigating whether balancing authorities could remove any disincentives to generators providing PFR service. As stated in PIOs' comments on the Notice of Inquiry, and described further in the comments of the Electric Power Research Institute,¹⁹ current energy market designs may create disincentives for resources to provide PFR service.²⁰ Because few system operators account for frequency response in the energy settlements system, a generator that deviates from its assigned generation schedule, due to the autonomous response of its governors, may face an ex post downward adjustment in the locational marginal price it anticipated for that timeframe or even financial penalties for straying from the schedule.²¹ Because there is currently no other incentive for existing generators to provide PFR service, any real or perceived risk associated with energy market disincentives would induce generators to disable or reduce the responsiveness of their governors. To better understand and address this potential obstacle, the Commission could require jurisdictional organized energy markets to evaluate whether their energy market settlement processes create any such disincentives and identify reforms that would remove those barriers. In addition, the Commission could consider allowing state regulators and other stakeholders access to information about which generators have partially or entirely disabled their generators or are providing frequency response in the wrong direction, which would be relevant to resource planning decisions made at the state level.

Second, PIOs urge the Commission to continue exploring options for procuring primary frequency response service through market-based mechanisms in jurisdictions with organized markets. Such procurement should be from all resources capable of providing this service, including storage and load, and should target frequency response service that is both fast and accurate. Quickly arresting frequency decay limits the depth of the frequency nadir, thereby helping to satisfy the reliability standard and reducing the risk of load shedding. Fast-responding frequency response is especially critical as the level

¹⁹ Comments Regarding the Provision and Compensation of Primary Frequency Response from the Electric Power Research Institute, RM16-6-000 (Notice of Inquiry), at 8-10.

²⁰ See Ela, E., et al., *Alternative Approaches for Incentivizing the Frequency Responsive Reserve Ancillary Service*, NREL/TP-5500-54393 (Mar. 2012).

²¹ *Id.* at 9. In a June 2015 presentation, a NERC employee characterized the risk of such penalties as a misconception, noting that the timeframe for providing PFR is shorter than the time intervals used to measure discharge imbalance or assess deviation charges, and that some tariffs allow for exemptions for deviations caused by providing this service. See Rich Bauer, *Frequency Response Initiative, Generator Governor Frequency Response*, presentation at 2015 MRO Reliability Conference (June 17, 2015), slide 17, available at <https://www.midwestreliability.org/MRODocuments/Generator%20Governor%20Frequency%20Response%20-%20Rich%20Bauer.pdf>. A widespread perception of such penalties, even if not founded in fact, could still be an important factor in generators' decisions to disable their governors.

of inertial response on the system declines,²² and incentivizing the provision of fast-responding PFR may also enable balancing authorities to procure less PFR service overall.²³ Focusing procurement efforts on fast-responding PFR would also create a strong incentive for the development of energy storage resources that are especially capable of providing this service.²⁴

D. Conclusion

The undersigned PIOs appreciate the opportunity to comment on this proposed rule, and look forward to further engagement with the Commission and balancing authorities on this important piece of an affordable and reliable clean energy future.

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Respectfully submitted,



Casey Roberts
Staff Attorney
Sierra Club

Submitted on behalf of:

Julia Prochnik
Director of Western Renewable Grid Planning
Natural Resources Defense Council
111 Sutter St., 21st Floor
San Francisco, CA 94104

²² See RM16-6-000, Notice of Inquiry P 13 (noting that as system inertia declines, frequency nadirs will drop “if the primary frequency capability online is not sufficiently fast”).

²³ The now-tabled Future Ancillary Services framework in ERCOT included both Fast Frequency Response and Primary Frequency Response products and when clearing the market for the overall Responsive Reserves, accounts for FFR’s enhanced effectiveness at supporting frequency in low-inertia conditions through the use of an equivalency ratio. Doing so allows for reduced procurement of Responsive Reserves. See Newell *et al.*, Brattle Group, Cost-Benefit Analysis of ERCOT’s Future Ancillary Services (FAS) Proposal (Dec. 2015), at iii, 9-10, available at http://www.ercot.com/content/wcm/key_documents_lists/30517/667NPRR_12a_Cost_Benefit_Analysis_122115.pdf. Together with removing a 50% limit on load participation, the Brattle Group estimated that accounting for the relative value of FFR and PFR in market clearing resulted in a 9% reduction in Responsive Reserves procurement, compared to the current ancillary services framework. See *id.* at 10.

²⁴ See Comments of Public Interest Organizations, RM16-6-000 (Notice of Inquiry), at 7-10.

Nancy Kelly
Senior Policy Advisor
Western Resource Advocates
9463 N. Swallow Rd.
Pocatello, ID 83201

Eric DeBellis
Associate Attorney
Environmental Law & Policy Center
35 E. Wacker Drive, Suite 1600
Chicago, IL 60601

Amanda Ormond
Managing Director
Western Grid Group
2303 N. Timberline Road
Flagstaff, Arizona 86004

Jim Baak
Program Director, Grid Integration
Vote Solar
360 22nd Street, Suite 730
Oakland, CA 94612

Frank Rambo
Senior Attorney
Southern Environmental Law Center
201 West Main St., Suite 14
Charlottesville VA 22902

Sophie Hayes
Staff Attorney
Utah Clean Energy
1014 2nd Ave.
Salt Lake City, UT 84013