

**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 ELECTRIC POWER SUPPLY ASSOCIATION, INDEPENDENT
POWER PRODUCERS OF NEW YORK INC., THE NEW ENGLAND POWER
GENERATORS ASSOCIATION, INC., AND THE WESTERN POWER TRADING
FORUM**

The Electric Power Supply Association (“EPSA”),¹ Independent Power Producers of New York Inc. (“IPPNY”),² New England Power Generators Association, Inc. (“NEPGA”),³ and Western Power Trading Forum (“WPTF”)⁴ (collectively, “Competitive Suppliers”) submit these comments in response to the Federal Energy Regulatory

¹ EPSA is the national trade association representing leading competitive power suppliers, including generators and marketers. Competitive suppliers, which collectively account for 40 percent of the installed generating capacity in the United States, provide reliable and competitively priced electricity from environmentally responsible facilities serving power markets. EPSA seeks to bring the benefits of competition to all power customers. The comments contained in this filing represent the position of EPSA as an organization, but not necessarily the views of any particular member with respect to any issue.

² IPPNY is a not-for-profit trade association representing the independent power industry in New York State. Its members include nearly 100 companies involved in the development and operation of electric generating facilities and the marketing and sale of electric power in New York. IPPNY’s members include suppliers and marketers that participate in the NYISO’s energy and capacity markets. This pleading represents the position of IPPNY as an organization, but not necessarily the views of any particular member with respect to any issue.

³ NEPGA is a private, non-profit trade association advocating for the business interests of competitive electric power generators in New England. NEPGA’s member companies represent approximately 26,000 megawatts of installed capacity throughout the New England region. NEPGA’s mission is to promote sound energy policies which will further economic development, jobs, and balanced environmental policy. NEPGA’s member companies are responsible for generating and supplying electric power for sale within the New England bulk power system. As active participants in the ISO-NE capacity and wholesale electricity markets, NEPGA’s member companies have substantial and direct interests in the outcome of these proceedings, and those interests cannot be adequately represented by any other party in the proceeding. The comments expressed herein represent those of NEPGA as an organization, but not necessarily those of any particular member.

⁴ WPTF is a California nonprofit, public benefit corporation. It is a broad-based membership organization dedicated to enhancing competition in Western electric markets while maintaining the current high level of system reliability. WPTF supports development of competitive markets throughout the West and the development of uniform rules to facilitate transactions among market participants.

Commission’s (“FERC” or “Commission”) Notice of Inquiry (“NOI” or “Notice”) on *Essential Reliability Services and the Evolving Bulk-Power System – Primary Frequency Response* issued on February 18, 2016.⁵ In the NOI, the Commission seeks comments on the need for reform of Commission rules and regulations regarding the provision and compensation of primary frequency response. Specifically, the Commission requests comment on whether amendments to the pro forma Large Generator Interconnection Agreement (“LGIA”) and Small Generator Interconnection Agreement (“SGIA”) are needed to require all new generation resources to have frequency response capabilities as a precondition to interconnection. In addition, the Commission seeks comment on the performance of existing resources and whether primary frequency response requirements for these resources is required. Further, comment is sought regarding compensation for primary frequency response.

The Competitive Suppliers appreciate that the Commission has taken the step of issuing an NOI to consider reforming its rules and regulations regarding “essential reliability services,”⁶ focusing specifically on the provision and compensation of primary frequency response in this inquiry. Competitive Suppliers have always stressed from both resource adequacy and operational perspectives that reliability is ensured by having ample supplies of affordable and environmentally responsible electricity available to serve the grid. This requires generation from a network of plants operating simultaneously with base load, mid-merit and peaking capabilities utilizing a range of fuels and technologies to meet electricity demand which fluctuates seasonally,

⁵ *Essential Reliability Services and the Evolving Bulk-Power System—Primary Frequency Response*, Notice of Inquiry, 154 FERC ¶ 61, 117 (2016) (“NOI”).

⁶ Essential Reliability Services are referred to as elemental reliability building blocks from resources (generation and load) that are necessary to maintain reliability of the Bulk-Power System (“BPS”). See Essential Reliability Task Force Scope Document at 1 (April 2014).

throughout the day and throughout the hour. As Competitive Suppliers strongly advocate and the Commission has acknowledged, the best approaches are market-based mechanisms that, to the maximum extent possible, are technology and fuel neutral. The pathway to the most cost effective and equitable solution is to allow existing resources to compete with newer technologies on a level playing field. In some instances, narrowly-defined or limited products or services may warrant cost-based compensation⁷ should the development of a market-based approach be prohibitive. In either case, it is important and commendable that the Commission, in examining the attributes and need for frequency response in light of a changing resource mix, also seeks comment on the compensation of frequency response as an essential reliability service.

Competitive Suppliers believe that in well-functioning wholesale markets primary frequency response should be a capability-based service with defined attributes to attract those resources which can provide the service most competitively. Notably, though, primary frequency response (and inertia, a related and necessary separate product discussed below) represent very specific services offered in extremely short durations. Providing these services, which are without question essential for reliability, requires a sufficient and appropriate compensation mechanism. This becomes even more critically important as the resource mix increasingly shifts towards resource types that do not provide primary frequency response, inertia and other essential reliability services whether as a by-product of how they generate electricity (e.g., inertial response) or through specific additional equipment (e.g., governors and primary frequency response).

⁷ *American Elec. Power Serv. Corp.*, Opinion No. 440, 88 FERC ¶ 61,141 (1999), *on reh'g*, 92 FERC ¶ 61,001 (2000). (For background discussion, see PJM Compliance Filing Regarding Reactive Power Capability at 1-5, Docket Nos. ER15-696 and EL15-15, filed December 22, 2014).

This inquiry is the first step in what should be a comprehensive and extensive examination of adequate compensation for *all* such essential reliability services. In this case, for instance, primary frequency response and inertia *may* represent services that are so narrow in duration that it is the capability to provide such response that presents the greatest value and the basis for compensation. As a general principle, Competitive Suppliers support market-based approaches. It *may be* that in this unique set of circumstances the administrative costs of a new market mechanism to compensate for activation of the capability may not be justified in light of how infrequently and for what short time duration the product would be procured. Much like capacity or operating reserves, the value of these services lies principally in the presence of the capability of the system to respond (in this case automatically) to an unexpected frequency decline. Competitive Suppliers believe there are market-based approaches which can procure this capability on a forward basis to satisfy reliability planning needs. However, were a full examination of the issues to show that cost-based compensation is best for this situation – a result that may be necessary if the service is mandated from all resources – that would of course not necessarily indicate similar outcomes for the multitude of new or revised services on which the system will rely in light of significant changes to resource capabilities, technologies and requirements. Generally speaking, market-based approaches for essential reliability services compensation should be preferred wherever possible.

In any event, whether market-based or cost-based procurement, resources that provide essential reliability services such as primary frequency response and inertia should be explicitly compensated through advance procurement as opposed to

mandating generators provide them without distinct and additional compensation. Given that the effect of having more resources that do not provide these essential reliability services as a natural by-product of their generation technology is to suppress market-clearing prices, both because these resources do not have marginal costs while market-clearing prices are based on marginal costs and because many of these newer resources are subsidized, it would not be just and reasonable to mandate generators provide these needed services without appropriate compensation above and beyond market-clearing prices for energy. Approaching these issues with these factors in mind should be a high priority for the Commission, regional system operators and market participants alike.

I. COMMENTS

A. Commission Jurisdiction and Responsibility over Reliability

The power sector is in the early stages of what will likely be a multi-year, even multi-decade, series of profound changes to how electricity is generated and consumed. In one of several forums addressing these coming changes, EPSA⁸ participated in NERC's development of the Essential Reliability Task Force Measures Report ("ERS Report") that analyzed the impact of the changing resource mix and its impact on the Bulk Power System ("BPS"). The Report looks at whether and how these looming system changes may require additional or revised services to ensure reliable electricity service, including frequency response. The ERS Report summarized:

Analyses of these emerging changes must be done to allow for effective planning and provide system operators the flexibility to modify real-time operations for reliability of the grid. Policies need to encourage this type of planning and support the necessary flexibility.⁹

⁸ EPSA participated in the NERC Task Force as a representative of competitive suppliers generally.
⁹ ERS Report Abstract.

The NOI appropriately seeks input on how to attain the flexibility necessary to support reliability of the system and maintain the integrity of wholesale markets. While maintaining sufficient frequency response has been achieved to date, the changing resource mix presents new challenges that will require the Commission and system operators to implement new or revised tools and services. Competitive Suppliers therefore appreciate that the Commission is herein investigating primary frequency response as an initial step in what should be a broad examination of essential reliability services. Beginning this inquiry now sets in motion important and timely analysis.

As the Commission notes in the NOI, assessments about how much primary frequency response is needed in each interconnection is in the initial stages within the NERC regime, that will evaluate primary frequency response and all other existing aspects of responding to frequency events. Competitive Suppliers believe the Commission should consider whether future NERC compliance filings and other informational filings offer sufficient information to the Commission on the nature, size, and timing of all frequency response issues. Based on the NERC filings, FERC should have a strong record to determine whether, where and what action or reform is necessary.

The provision of primary frequency response is one of several important real-time BPS reliability management tools which assists in ensuring stability, responds to events and disturbances, and restores system frequency following a disturbance. In Order No. 794,¹⁰ approving Reliability Standard BAL-003-1, the Commission correctly expressed the concern that sufficient resources may not be available for applicable entities to meet

¹⁰ Frequency Response and Frequency Bias Setting Reliability Standard, Order No. 794, 146 FERC ¶ 61,024 (2014).

their Frequency Response Obligation and, therefore, required NERC to provide that information, together with appropriate recommendations for mitigation.¹¹ Competitive Suppliers agree that some regions of the country face challenges in the near-term with respect to whether applicable entities can maintain their Frequency Response Obligation. Therefore Competitive Suppliers share the Commission's concern that the changing resource mix will impact planning for reliability, including the provision of primary frequency response, and that such impacts will need to be addressed.

B. Existing Generation and Primary Frequency Response

The Commission states that BAL-003-1 and the pro forma LGIA and SGIA do not specifically address generators' provision of primary frequency response.¹² In the NOI, the Commission asks whether the LGIA and SGIA should be changed to include provisions requiring generators, including non-synchronous resources, to provide frequency response capabilities as a precondition to interconnection. The NOI correctly notes that in previous years many non-synchronous resources were not consistently designed with primary frequency response capabilities. However, as the NOI points out, the technology does now exist for non-synchronous generation resources to install the equipment needed to provide frequency response.¹³

However, while the technology may exist, the costs remain steep for all generators. Therefore, Competitive Suppliers do not believe that the Commission should mandate primary frequency response requirements for existing resources. First, the cost of retrofitting existing units' equipment would be expensive and not justified without

¹¹ Order No. 794 at P 3. NERC will provide timely and comprehensive reports to FERC as required by Order No. 794.

¹² NOI at P 41.

¹³ NOI at P 19.

supporting evidence that the expense would have an equal or greater corresponding reliability benefit. Moreover, such a requirement for all existing generation would not be practical given the significant differences among resource types in each region and the differing determinations of the most appropriate settings for governors. Also, as the NERC Reports attest,¹⁴ the degree of need for meeting primary frequency differs from interconnection to interconnection; similarly, different Balancing Authorities (“BAs”) may need flexibility across resources rather than imposing uniform settings on all of its generation resources. Further, as a practical matter, maintaining adequate frequency response does not require every resource to provide it. Sufficient access to frequency response can be met by having sufficient capability within a subset of resources. Finally, as discussed further below, mandating equipment with uniform settings from all generating resources would limit the ability to establish a capability-based service to meet these needs. The key is to incent provision of the service to the desired level, which is best done through compensation for this capability.

C. New Generation and Primary Frequency Response

While EPSA does not fully oppose amending the *pro forma* LGIA and SGIA to require all *new* generating resources to have the capability to provide primary frequency response, this alone will not address all the issues facing system operators, and again may involve costs exceeding that necessary to assure sufficient frequency response for system reliability. Therefore, the Commission should explore more effective and cost efficient ways to address the range of issues posed. For instance, the Commission has authority to encourage jurisdictional entities to seek approval to revise their applicable *pro forma* interconnection agreements and procedures as needed on a prospective

¹⁴ NOI at P 31.

basis. Specifically, the Commission could encourage applicable entities to consider making changes of their *pro forma* interconnection agreements in certain regions where it is a reasonable and beneficial expense to explicitly address primary frequency response capability. As discussed below, when a compensation mechanism has been defined and implemented, resources may be incented to add frequency response technology and may seek Commission approval to include such changes as a compensated election in their interconnection agreements. Such incentives and opportunities will help address the issues in those regions that face challenges with primary frequency response in the very near-term.

This measured approach should be fully considered before mandating governors for all prospective interconnecting generation. Currently, interconnecting generators must comply with NERC standards as part of their interconnection agreements. Therefore, as NERC standards (such as the BAL standards through Order No. 794) are put in place and are measured they will set the standards for ongoing system needs. These standards provide the benchmark capabilities that transmission providers in each interconnection can use to assure they have sufficient primary frequency response capability. Competitive Suppliers recommend that the Commission's ongoing evaluation of NERC standards offers the best forum for providing information to assess the need to mandate frequency response capable governors broadly, or whether there is a more efficient approach to incentivize needed capability. Without extensive evidence across markets, implementation of a generic mandate risks "gold plating" the system and unnecessarily raising costs for consumers. While Competitive Suppliers recognize that the provision of primary frequency response has been experienced as a concern

regionally, this may not adequately or reasonably support changes to national policy compelling governors for all generators. For instance, frequency response measurement in the LBNL Report¹⁵ highlights that the concentration of generators with primary frequency response capability determines the quality of the response.¹⁶ In making this point, the LBNL Report does not contend that all generators need primary frequency response capability. Consequently, to mandate that all generators – new or old – add and maintain governors risks that numerous generators bear such costs at levels that exceed what is needed to meet the reliability need.

D. Compensation for Primary Frequency Response

1. Frequency Response Elements

Competitive Suppliers agree that primary frequency response represents a reliability issue for system operation. Competitive Suppliers appreciate that, importantly, the Commission is also exploring related compensation issues. In order to ensure that this discussion adequately addresses the need to compensate this service, it is important to define what frequency response is and how its capabilities contribute to system reliability.

Much as the NOI asserts, “(i)ntertial response, primary frequency response and secondary frequency response all contribute to overall Frequency Response and stabilizing the BPS by correcting frequency deviations.”¹⁷ Primary frequency response

¹⁵ *Use of Frequency Response Metrics to Assess the Planning and Operating Requirements for Reliable Integration of Variable Renewable Generation*, Ernest Orlando Lawrence Berkeley National Laboratory, at 13-14 (December 2010), available at: <http://energy.lbl.gov/ea/certs/pdf/lbnl-4142e.pdf> (“LBNL Report” of “LBNL Frequency Metrics Report”).

¹⁶ Referred to as Primary Frequency Response Reserves in the LBNL Report.

¹⁷ NOI at P 4.

as part of overall Frequency Response is described in the NOI from the LBNL Frequency

Metrics Report:

Primary frequency response is mostly provided by the automatic and autonomous actions (i.e., outside of system operator control) of turbine-governors, while some response is provided by frequency responsive loads due to changes in system frequency. Primary frequency response actions are intended to arrest the frequency deviation until it reaches the minimum frequency, or nadir.¹⁸

By contrast, inertial response is the initial system response that works to reduce the change of frequency by allowing time for primary frequency response actions to arrest the frequency deviation and stabilize the power system. While both inertial response and primary frequency response play a part of the first 15 seconds of stabilizing frequency, they are distinguished as separate and distinct services in the NOI.

EPSA on the behalf of the Competitive Suppliers commented previously that overall Frequency Response would be best defined as a distinct tariffed service.¹⁹ Additionally, EPSA asserted that, based on defining a service conforming to NERC's petition that led to Order No. 794, there are specific elements that should be evaluated for treatment pursuant to a market mechanism for Frequency Response:

- Balancing inertia, which is that resistance of rotating generators to reduced rotational speed as frequency declines by virtue of their rotating mass;
- Load damping, which is energy not used by loads as the speed of rotating motors slows with frequency declines;
- Loads set to trip automatically at set points that are above the highest under frequency load setting (UFLS) trip points within an interconnection; and
- Governors on generators that are set to automatically increase output by increasing the input power of their prime mover when frequency declines.²⁰

¹⁸ NOI at P 6.

¹⁹ That assertion is largely based on the real need due to the changing resource mix for secondary frequency response and the associated ramping inherent to the later stages of arresting frequency deviations. As the NOI notes, Frequency Response can last for up to 5 minutes from the initial deviation and thereby can be more easily structured as a compensated service.

²⁰ Post-workshop Comments of the Electric Power Supply Association, *Third-Party Provision of Reactive Supply and Voltage Control and Regulation and Frequency Response Services*, Docket No. AD14-7-000, page 16 (filed June 9, 2014), referencing *Petition of the North American Electric Reliability*

Inertia is cited as crucial to contributing to overall frequency response in the LBNL Report. While the Commission distinguishes inertia from primary frequency response in the NOI, it is part of the same important first 15 seconds of response in the event of a frequency drop. Therefore the NOI errs in not defining inertia as an important, related service to primary frequency response that also needs to be compensated. Currently, while inertia is providing valuable reliability support, it is an uncompensated value provided to the BPS. Prior resource economics and operations enabled the provision of this needed service without specific payments. However, new technologies in wind and solar generation supported by various subsidies are changing relative resource economics, as well as the actual resource mix. As is the case with primary frequency response, there will be less inertia on the system as the resource mix continues to change. The Commission needs to factor in and support inertial response given its equal importance to addressing overall frequency response. It would be prudent and reasonable to assure adequate incentives for both inertial response and frequency response before either begins to run short of the amounts needed. Much like primary frequency response, the provision of inertia should be considered as a capability service for compensation as discussed below.

2. Primary Frequency Response as a Capability Service

As addressed above, there is not sufficient evidence to justify a mandate that every generator have primary frequency response capability. Simply requiring primary frequency response from *all* resources may result in inefficient costs for service that is

simply not needed from every resource. Conversely, mandating that primary frequency response be provided by certain types of resources and not others would be discriminatory as the Commission addressed in its NOPR on reactive power.²¹ As the Commission considers primary frequency response as a service to be separately compensated, the first consideration should be to ensure a level playing field; Balancing Authorities can and should establish primary frequency response as a service that all resources can compete to provide based on the capabilities needed in that BA. This approach offers generators the flexibility to make the physical changes needed to meet the capabilities required by its BA, or to incur the costs to maintain equipment to provide the service. This can mean either adding (or maintaining) a governor or tuning it to meet the BA's specifications. This approach allows for a service to be developed and paid for by the BA.

As explained in the NOI, there are three levels of response to frequency deviations. The initial, immediate response comes from system inertia. This is followed by primary frequency response, provided by automatic and autonomous actions of turbine governors and frequency responsive load. Primary frequency response typically takes place in the first 15 seconds after an event. After 30 seconds secondary frequency response involving changes to MW output of resources on automatic generation control²² respond to dispatch. Relevant to this NOI, a market-based approach to frequency response should focus on insuring sufficient capability exists to respond to frequency deviations for the first 30 seconds of the event. It should focus on sending a market

²¹ *Notice of Proposed Rulemaking, Reactive Power Requirements for Non-Synchronous Generation*, Docket No. RM16-1-000 (issued Nov. 19, 2015), at P. 1.

²² *Automatic Generation Control (AGC) and Schedule 3 Regulation and Frequency Response Services*

signal to insure sufficient primary frequency response capability exists, and while recognizing the value inertia provides in maintaining system frequency.

A market-based approach to primary frequency response is best handled using a capability-based construct, recognizing and compensating this capability as described in the NOI.²³ A separate capability market (akin to the Locational Forward Reserve Market forward procurement of operating reserve in ISO-NE) could be established for primary frequency response. Resources with the capability to provide primary frequency response would be paid for its commitment to supply the capability and provide primary frequency response in that period. Focusing on the procurement of PFR as a capability has several advantages. While demand for capability can be easily modeled as a target for reliability planning purposes, it is much more difficult to establish a market-based compensation mechanism for activations of primary frequency response to frequency deviation events. Frequency deviation events are difficult to predict and of short duration, making it difficult to apply a market based approach to the actual response. A capability-based approach would properly value the ability of system operators to rely on primary frequency response in its commitment and dispatch and to send a clear market signal to developers to build primary frequency response capability into future resources. Further, to the extent the capability-based approach is implemented via a separate capability-based market that is a forward looking, there will be a market signal to future developers. Finally, a capability-based market approach will ensure that resources with the capability to provide primary frequency response are compensated for that capability, and resources without the capability are not. This is most transparently and easily

²³ NOI at P 54.

accomplished through a stand- alone capability-based market approach to primary frequency response.

Note that there is more than one possible approach to develop a compensation mechanism for the provision of primary frequency response and inertia. As an NOI is merely the first step in a robust examination of current issues and possible concerns, Competitive Suppliers urge the Commission to (1) establish these services as essential reliability services and (2) develop compensation approaches to ensure sufficient capacity and provision of such services as needed to maintain a reliable electric system. Importantly, this inquiry should represent the first of many steps to address the emerging needs of the Bulk Power System. The broad acceptance of and conversation around the changing needs of the existing wholesale electricity system bode for a timely, broad examination of market-based approaches for essential reliability services and the required compensation. This should be among the highest priorities for the Commission, regional system operators and market participants alike.

II. CONCLUSION

WHEREFORE, Competitive Suppliers support the Commission's NOI to consider reforming its rules and regulations regarding "essential reliability services," focusing specifically on the provision and compensation of primary frequency response in this inquiry. In well-functioning wholesale markets primary frequency response should be a capability-based service with defined attributes to attract those resources which can provide the service most competitively pursuant to an adequate compensation mechanism, per the discussion above. Importantly, this inquiry is the first step in what

should be a high priority, comprehensive examination of adequate compensation for *all* such essential reliability services.

Respectfully Submitted,

/s/

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