UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

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

JOINT COMMENTS OF ISO NEW ENGLAND INC., NEW YORK INDEPENDENT SYSTEM OPERATOR, INC., PJM INTERCONNECTION, L.L.C., SOUTHWEST POWER POOL, INC. AND INDEPENDENT ELECTRICITY SYSTEM OPERATOR

Pursuant to the Federal Energy Regulatory Commission's ("Commission") Notice of Inquiry ("NOI") issued on February 18, 2016,[1] ISO New England Inc. ("ISO-NE"), New York Independent System Operator, Inc. ("NYISO"), PJM Interconnection, L.L.C. ("PJM"), Southwest Power Pool, Inc. ("SPP"), and Independent Electricity System Operator ("IESO") (together, the "Indicated ISOs/RTOs") submit these joint comments in response to the questions posed by the Commission in the NOI.

In the NOI, the Commission seeks comment on possible actions to ensure that the provision of primary frequency response continues to remain at levels adequate to maintain the reliability of the Bulk-Power System in light of the ongoing transformation of the nation's generation resource mix.[2] Specifically, the Commission seeks comment on three possible actions: (1) modifications to the *pro forma* Large Generator Interconnection Agreement ("LGIA") and Small Generator Interconnection Agreement ("SGIA") mandating primary frequency response requirements for new resources; (2) new primary frequency response

[1] Notice of Inquiry, *Essential Reliability Services and the Evolving Bulk-Power System - Primary Frequency Response*, Docket No. RM16-6-000 (February 18, 2016).

[2] NOI at P 37.

requirements for existing resources; and (3) the requirement to provide and compensate for primary frequency response.[3] As fully explained below in the answers to the Commission's specific questions, the Indicated ISOs/RTOs believe that the *pro forma* LGIA and SGIA should be revised to include primary frequency response requirements for all newly interconnecting resources. In addition, the Indicated ISOs/RTOs believe that a NERC Reliability Standard that requires all NERC registered generators to provide primary frequency response should be developed. Through this NERC Reliability Standard, the same requirements imposed on new resources should be imposed on existing resources. The Indicated ISOs/RTOs also believe that additional infrastructure is needed to verify primary frequency response performance. Finally, the Indicated ISOs/RTOs do not believe that separate compensation or a market mechanism are needed for primary frequency response. Detailed answers to the Commission's specific questions are included in Section II of these joint comments.

I. IDENTIFICATION OF FILING PARTIES

ISO-NE is the private, non-profit entity that serves as the Regional Transmission Organization ("RTO") for the six New England states. NYISO is a not-for-profit corporation responsible for providing open-access transmission service and administering open and competitive wholesale markets in New York State. PJM serves as the RTO in all or part of thirteen states and the District of Columbia. SPP is the RTO for all or part of fourteen states. IESO is the RTO for Ontario, Canada. Among other functions, the Indicated ISOs/RTOs are registered with NERC as Balancing Authorities.

[3] *Id.* at P 40.

II. ANSWERS TO QUESTIONS POSED IN THE NOI

A. Modifications to the *pro forma* LGIA and SGIA

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?

Yes. All newly interconnecting generating resources, regardless of technology type, should be required to install the capability necessary to provide primary frequency response. Some ISOs already require these capabilities.[4] For example, in ISO-NE, the LGIA already requires the provision and maintenance of a functioning governor on all new generating units comprising the Large Generating Facility in accordance with applicable provisions of the ISO New England Operating Documents and Applicable Reliability Standards. ISO New England Operating Procedure No. 14 ("OP-14") contains specific frequency response requirements.

Similarly, the NYISO's LGIA requires that governors and automatic voltage regulators be in automatic operation at all time when the facility is operating and connected to the New York State Transmission System.[5] Where governors and automatic voltage regulators are not capable of such automatic operation, the facility owner is required to notify the NYISO and to ensure that its real and reactive power are within the design capability of the facility's generating unit(s) and steady state stability limits as well as NYISO system operating limits (*i.e.*, thermal, voltage and transient stability limits).[6]

PJM Manuals also require generators to operate on unrestricted governor control to assist in maintaining interconnection frequency, except for the period immediately before being removed from service and immediately after being placed in service. Governor outages during periods of operations must be kept to a minimum and must be immediately reported to PJM. When a generator governor is not available, the unit output should not fluctuate from pre-scheduled output unless otherwise directed.[7]

In addition to requirements in the LGIA and SGIA, a NERC Reliability Standard that requires all NERC registered generators to provide primary frequency response should be developed. This will provide independent reliability value, and will also facilitate Balancing Authorities' compliance with the requirements of NERC Reliability Standard BAL-003-1. Currently, under NERC Reliability Standard BAL-003-1 Balancing Authorities are obligated to meet frequency response requirements. However, their ability to meet those requirements is dependent on the

[4] The Indicated ISOs/RTOs believe that non-FERC jurisdictional interconnecting resources should also contribute to system reliability by providing primary frequency response, where applicable, through the appropriate establishment of industry standards.

[5] NYISO Open Access Transmission Tariff Section 30, Appendix 6, § 9.5.4.

[6] *Id*.

[7] PJM Manual 14D.

frequency response provided by generators. NERC Reliability Standard BAL-003-1 in essence places a responsibility on Balancing Authorities without establishing the corresponding authority for Balancing Authorities to require primary frequency response capability from generators within their footprints. Accordingly, Balancing Authorities have limited control of compliance with their obligations regarding frequency response. To mitigate this disconnect, a NERC Reliability Standard should impose appropriate frequency response requirements on generators that apply regardless of technology type. This standard should set the floor. The SGIA and LGIA could impose more stringent frequency response requirements if warranted based on system conditions, as determined by the relevant interconnection studies. Furthermore, generator obligations under a NERC Reliability Standard and under the LGIA/SGIA should be coordinated to ensure efficient and effective implementation.

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)?

Absent unique local requirements (*e.g.* some remote areas of the grid may need a smaller droop), NERC's Guidelines provide a sound baseline and are consistent with current requirements in some regions, for example, ISO-NE, NYISO, and PJM. However, the NERC Guidelines should not preclude more stringent requirements if warranted.

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?

Yes.

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

Yes.

2. What are the costs associated with making a newly interconnecting generation resource capable of providing primary frequency response?

Specifically, what are the pieces of equipment or software needed to provide primary frequency response, and what are the costs associated with those pieces of equipment or software? Are there significant differences between synchronous and non-synchronous resources in providing primary frequency response, (*e.g.*, the type of equipment necessary)?

The Indicated ISOs/RTOs defer to the equipment manufacturers for exact costs; however, the Indicated ISOs/RTOs believe that the incremental costs related to properly setting the governor and distributed controls are relatively minor.

The Indicated ISOs/RTOs are not aware of any rotating generators that do not have some type of speed and MW control. The issue is whether the equipment is set to operate when needed. Moreover, the provision of reliability support outweighs any potential one-time cost associated with primary frequency response equipment.

3. Regarding question (1) above, are the governor control settings recommended by NERC's Primary Frequency Control Guideline the appropriate settings to include in the *pro forma* LGIA and SGIA? Why or why not?

Yes, if generators in an Interconnection had common settings, it means the maneuvering done by any single generator for a frequency perturbation is significantly reduced and reliability is enhanced.

4. Regarding new resources, including non-synchronous resources, are there physical, technical, or operational limitations/concerns to promptly providing sustained primary frequency response in the direction necessary to counteract under-frequency and over-frequency deviations? How should new requirements account for such limitations?

To the best of their knowledge, the Indicated ISOs/RTOs are unaware of any physical, technical, or operational limitations that prevent generators from promptly providing sustained primary frequency response.

5. Are metrics or monitoring useful to evaluate whether new resources:

5.1. Operate with governors (or equivalent frequency control devices) enabled?

Yes, this information is useful and should be required.

5.2. Set governor control settings as described in question (1) above?

Yes, this information is useful and should be required.

5.3. Provide sustained MW response (when the unit has available headroom and system frequency deviates outside of the dead band) that is in the direction necessary to correct the frequency deviation and responsive in accordance with a specified droop parameter?

Yes, this information is useful and should be required.

6. How would transmission providers verify that new resources provide adequate primary frequency response performance?

The Indicated ISOs/RTOs believe that there are different ways to verify generator performance with respect to primary frequency response. The Commission should allow each region to develop rules that meet the verification goal and are consistent with a region's rules.

For example, ISO-NE and NYISO examine frequency events to determine system performance. It takes multiple events for ISO-NE and NYISO to be able to classify generators as fully performing, partially performing, or non-performing. To be able to accurately determine an individual generator's performance, the measurement would have to be done with sufficient granularity to capture the necessary data for validation. In addition, the measurements would need to be time synchronized, meaning that the time stamps for the same event is the same across wide areas. The data would also need to be readily available in a usable format. One possible implementation - already found useful by the Indicated ISOs/RTOs - could be a network of Phasor Measurement Units.

PJM currently monitors generator performance during frequency excursions as part of the BAL003 pilot and communicates outlier performance to the respective generating units.

In the SPP region, SPP receives frequently sampled data (every few seconds) from the generator. SPP notes that there may be precision issues with sampling and time synchronization, but this data could serve as the basis for assessing performance. To the extent modifications are required, SPP could develop appropriate changes or new rules to facilitate accurate verification procedures.

6.1. What information is necessary in order to facilitate performance verification?

Please see answer to question A.6 above.

6.2. What changes, if any, to existing infrastructure (including, but not limited to telemetry and software tools) would be required in order to verify primary frequency response performance?

The answer to this question depends on the level of accuracy required for verification. SCADA data may provide a basis for adequate verification, but may not be as precise as other means, such as using Phasor Measurement Units as the basis for verification. High speed recorders (such as Phasor Measurement Units mentioned in the answer to question A.6) would provide more precise measurement potential, but the cost of developing the infrastructure needed to support this means of measurement may vary by region. Furthermore, other support capabilities such as upgraded communications and increased data storage may also facilitate performance verification procedures.

As discussed above, with respect to performance verification, the Commission should allow each region to develop rules that achieve the goal of verification in a manner that is consistent with the region's rules and circumstances. The Commission could then review such proposals and assess them on their merits relative to the Commission's ultimate goals with respect to verification.

6.3. What limitations based on resource type, if any, should be considered

The Indicated ISOs/RTOs are not aware of any limitations that would preclude a resource type from providing primary frequency response verification to the Balancing Authority.

7. How would transmission providers ensure compliance with the new rules?

Appropriate rules, which could include a NERC Reliability Standard establishing requirements for generators to provide primary frequency response as well as appropriate regional interconnection and/or tariff rules, would need to be established. A NERC Reliability Standard would be subject to NERC's compliance and enforcement programs and regional tariff rules would be subject to the same processes that ISOs and RTOs utilize for other regional interconnection and/or tariff rules.

7.1. Are penalties appropriate to ensure that new generating resources adhere to the new requirements described in question (1) above, and if so, how should such penalties be structured and implemented?

As mentioned above, a NERC Reliability Standard establishing requirements for generators to provide primary frequency response should be developed. This should include data requirements and violation severity levels developed through the NERC standards development process. The current NERC Reliability Standards template includes measurement and penalty specifications. If a region has more stringent requirements for primary frequency response, penalties may be warranted for non-compliance with such regional rules. Each region should determine if incremental regional rules and associated penalties are appropriate. The ISOs/RTOs note that penalties for violation of a NERC Reliability Standard and any penalties for failure to comply with regional reliability rules should not overlap (*i.e.* an entity should not be subject to duplicative penalties).

7.2. Are penalties appropriate only if a resource receives compensation for adhering to the new requirements described in question (1) above?

Primary frequency response should be an inherent characteristic of resources that are interconnected to the power grid. As such, penalties would be appropriate for violation of a NERC Reliability Standard, the LGIA and SGIA and/or regional tariffs regardless of whether a generator receives separate compensation for its capabilities and operation.

B. New Primary Frequency Response Requirements for Existing Resources

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?

Yes, the same requirements imposed on new resources should be imposed on existing resources. At a minimum, requirements to provide primary frequency response should be included in a NERC Reliability Standard that applies to registered generators. This standard should include

requirements for both new and existing resources, and should recognize the potential need for a phased implementation for existing resources. This approach would not preclude the adoption of more stringent local standards if a particular area needs to do so.

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?

These practices should be prohibited. NERC Guidelines provide a sound baseline. It is possible that unique local requirements (*e.g*. some remote areas of the grid may need a smaller droop), may require deviation from the NERC Guidelines. If generators can show that they are not able to meet the guidelines, they should either apply for an exemption or an extension of time to meet them pursuant to local requirements.

At a minimum, a generator should be required to provide notice to the system operator of its situation along with a corrective action plan and a timeline for compliance. System operators need to be aware of each generator's circumstances in order to manage them. To the extent a NERC Reliability Standard is developed, it should recognize the potential need for exemptions and for coordination of such exemptions with appropriate reliability entities, *e.g.* Reliability Coordinators.

3. What are the costs of retrofitting existing units, including non-synchronous resources, and with specific reference to such factors as equipment types and MW capacity, to be capable of providing sustained primary frequency response?

In general, the equipment resides today on the vast majority of existing units. The cost is associated with setting the controls that are already in place. The Indicated ISOs/RTOs defer to equipment manufacturers for specific costs. However, the Indicated ISOs/RTOs believe that the provision of reliability support outweighs any potential one-time cost associated with setting primary frequency response equipment.

4. Regarding existing units, are there physical, technical, or operational limitations or concerns to promptly providing sustained primary frequency response in the direction necessary to counteract under-frequency and over-frequency deviations?

Generally, transmission operators do not set system operating limits that would preclude generators from providing primary frequency response. If a generator believes there are valid reasons why it cannot provide primary frequency, those reasons should be reviewed and addressed through a robust case-by-case exemption process pursuant to local requirements. Any potential conflict between the need for frequency response and operational choices made for reliable operation would need to be reviewed by the respective system operators.

C. Requirement to Provide and Compensate for Primary Frequency Response Service

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?

    1.1. "Capability" involves having a turbine governor or equivalent equipment that has the ability to sense changes in system frequency, and is enabled and set with appropriate governor settings (e.g., droop and dead band), and assuming capacity (or "headroom") has been set aside, the physical ability to ramp the resource quickly enough in order to provide useful levels of primary frequency response to help arrest the frequency deviation.

Yes. The Indicated ISOs/RTOs agree that all generating resources should be required to install the capability necessary to provide primary frequency response.

    1.2. "Performance" would involve putting the "capability" into actual service: i.e., actually operating the resource with governors or equivalent equipment enabled, ensuring that governor controls (e.g., droop and dead band) and other settings are properly set and coordinated, such that when capacity (or "headroom") has been set aside, the unit promptly provides sustained primary frequency response during frequency excursions, until system frequency returns to within the governor's dead band setting.

Yes. The Indicated ISOs/RTOs believe that generators should be required to provide primary frequency response under a NERC Reliability Standard.

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?

Requiring all new and existing units to have governor response spreads the requirement over a large mix of resources. This diversity is needed to address issues that could happen at the same time, *e.g.* some units may lack sufficient headroom, some units may be offline due to scheduled maintenance or forced outage, and/or some units may not be dispatched due to light load conditions. Requiring all units to provide primary frequency response ensures that the system operators will be able to meet emerging real-time events, which may not be the case if the system only has a smaller mix of frequency responsive resources. In addition, when more generators provide primary frequency response, the system will respond quicker to events. Since each generator's response is based on the frequency movement observed by that generator, not the number of generators responding, more generators responding to an event will not result in over-response to the event.

2.1. To the extent that balancing authorities are responsible for procuring adequate primary frequency response service, does the current framework for blackstart provide a useful guide for how primary frequency response service could be procured?

No. Primary frequency response and blackstart are two different types of capabilities. There are also fundamental differences in the required equipment, abilities and training.

Blackstart requirements are relative to a specific/defined issue and are, therefore, known and static. Accordingly, blackstart capability can be required from a limited set of resources. On the other hand, primary frequency response needs are relative to dynamic system conditions. As such, the most effective manner to meet the dynamic needs for primary frequency response is to establish uniform capability requirements that provide the system operator with a known amount of response, which facilitates the operator's ability to manage dynamic conditions in the most efficient and effective way possible.

2.2. Does the Commission's recent rulemaking allowing third-party sales of frequency response services at market based rates allow balancing authorities to procure sufficient amounts of primary frequency response as required by BAL-003-1?

Requiring all generators to provide primary frequency response would result in sufficient primary frequency response. Third party sales could complement that baseline capability, but such services should augment rather than replace the requirement that all resources provide primary frequency response.

2.3. To the extent that balancing authorities centrally optimize primary frequency response, wherein an algorithm optimizes in the operating horizon the set of resources in which to allocate primary frequency response headroom: should all newly interconnecting resources be required to install the necessary capability in these areas? Can balancing authorities predict far ahead of the operating horizon the least-cost set of resources from which it will optimize the provision of primary frequency response?

Balancing Authorities do not centrally optimize primary frequency response. If all resources are required to provide primary frequency response, then the rest of the issues are addressed. Please see answer to question C.2 above.

2.4. Would the costs of requiring all resources to have the capability to provide primary frequency response be significantly greater than the costs that would result from an Interconnection-wide or balancing authority-wide optimization of which generators should be capable of providing primary frequency response?

Please see answers to questions A.2, B.3, and C.2 above.

2.5. Would the costs of requiring all new resources to enable and set their governors, or equivalent equipment, to be able to provide primary frequency response in real-time be significantly greater than the costs that would result from an Interconnection-wide or balancing authority-wide optimization of which generators should provide primary frequency response in real-time?

Please see answers to questions A.2 and C.2 above.

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

Please see answer to question C.2.3 above.

2.7. Would requiring every resource to be capable of providing primary frequency response result in over-procurement or inefficient investment in primary frequency response capability to the detriment of customers?

Conventional generators have been required to have functioning governors for decades, so there should be no additional cost for those resources. Manufacturers of non-conventional generation (*e.g.*, wind, solar) have already developed the software needed to provide primary frequency response through their power electronics. Requiring all resources to provide frequency response establishes appropriate robustness in the system to cover the wide range of contingency conditions typically seen in operations and results in a system with no actuation of under-frequency load shedding. Please see answer to question C.2 above for additional details.

2.8. Without rules to compel performance, how would balancing authorities ensure that the optimal set of resources chosen by an optimization algorithm actually enable governor controls with appropriate governor settings so that they provide sustained primary frequency response when capacity (or "headroom") has been reserved and frequency deviates outside of their dead band settings?

The Indicated ISOs/RTOs do not believe that an optimization algorithm is necessary or appropriate. Please see answer to question C.2 above. As discussed throughout these comments, the most effective *and efficient* way to obtain sufficient primary frequency response is to establish a clear, uniform requirement that all newly interconnected resources and existing resources have primary frequency response capability through a combination of provisions in the LGIA/SGIA, tariff provisions, and/or a NERC Reliability Standard.

3. If generation resources were required to have minimum levels of primary frequency response capability or performance, should such resources be compensated for providing primary frequency response capability, performance, or both? If so, why? If not, why?

Primary frequency response should be an inherent characteristic of resources that are interconnected to the power grid. Moreover, primary frequency response is essential for reliability and should be provided broadly across each Interconnection. As such, it should

be required by a combination of provisions in the LGIA/SGIA, tariff provisions, and/or a NERC Reliability Standard.

The Indicated ISOs/RTOs do not presently provide specific compensation for primary frequency response, and they have not experienced concerns with primary frequency response in their areas.

The Indicated ISOs/RTOs have not undertaken any efforts to develop a separate compensation mechanism for primary frequency response. If the Commission deems it necessary to develop new compensation mechanisms in addition to payments already made to generators, the Indicated ISOs/RTOs urge the Commission to allow flexibility for each ISO/RTO to develop approaches suitable to its particular circumstances.

Because the incremental cost to provide frequency response is minimal and because in most cases generators presently have this capability through governor controls, establishing the "right" level of additional/separate compensation for frequency response could be quite contentious. While for some ancillary services it is appropriate to establish compensation and/or market mechanisms to incent behavior that may not otherwise be appropriately incented, in the case of frequency response, given that the incremental cost of providing the service is de minimis and given all of the other issues that ISOs and RTOs are currently addressing, the Indicated ISOs/RTOs do not believe that the best use of their resources and processes at this time would be to engage in debating the "right" level of compensation for primary frequency response or whether performance incentives are missing. The Indicated ISOs/RTOs believe that the Commission's goals may be achieved through the development of a new NERC Reliability Standard (or an appropriate extension of NERC Reliability Standard BAL-003-1). For this reason, the Indicated ISOs/RTOs request that the Commission hold this issue in abeyance pending the development of a NERC Reliability Standard as outlined above and an analysis of the results of the implementation of that standard in achieving the reliability requirements under the current overall compensation scheme for generators.

3.1. If payment is based on capacity (or "headroom") that is set aside for primary frequency response, how should such a capacity payment be structured and determined?

Please see answer to question C.3 above.

3.2. If payment is based on actual performance, either alone or in combination with a capacity-based payment, please discuss possible rate structures applicable to primary frequency response performance.

Please see answer to question C.3 above.

3.3. Will a market price provide resources with sufficient incentive to invest in primary frequency response capability and make the service available to the balancing authority in real-time, absent a requirement that resources maintain the capability to provide primary frequency response and perform as required?

Please see answer to question C.3 above.

4. Currently, how do RTOs/ISOs ensure that they have the appropriate amount of primary frequency response capability during operations?

The Indicated ISOs/RTOs are subject to NERC Reliability Standard BAL-003-1 and monitor their performance to the standard. The NYISO relies on the NERC Reliability Standard BAL-003-1 to maintain an appropriate amount of primary frequency response capability during operations.

Some ISOs also have regional rules for primary frequency response. For example, currently, ISO-NE ensures that it has sufficient amount of primary frequency response through its local requirements in OP-14. Specifically, Section II.I.1 of OP-14 provides that, for each Generator with a capability of ten MW or greater, the Lead Market Participant is required to provide, maintain and operate a "functioning governor," which includes hardware or software that provides autonomous frequency-responsive power control. This requirement applies to all types of Generators. Section II.I.4 of OP-14 further provides that all Generators 10 MW and greater within the New England Reliability Coordinator Area are expected to have a functioning governor and provide primary frequency response and support to the New England transmission system. Section 9.6.2.2 of ISO-NE's LGIA also requires the provision and maintenance of a functioning governor on all generating units comprising the Large Generating Facility in accordance with applicable provisions of the ISO New England Operating Documents and Applicable Reliability Standards.

PJM's rules are set forth in PJM Manual 14D, as discussed in the answer to question A.1.1 above.

4.1. Are resources contracted for primary frequency response outside of the market optimization and dispatch?

Resources are not contracted for primary frequency response in ISO-NE, NYISO, PJM, or SPP.

4.2. Alternatively, does the market optimization and dispatch incorporate primary frequency response in its optimization?

No, dispatch is not optimized for primary frequency response in ISO-NE, NYISO, PJM or SPP.

5. Would it be appropriate for RTOs/ISOs to create a product for primary frequency response service?

Please see answer to question C.3.

6. Are there benefits to separating Frequency Response Service under Schedule 3 and creating a separate ancillary service covering each individually? If so, how should a new *pro forma* Primary Frequency Response Ancillary Service be structured?

Based on their experience, the Indicated ISOs/RTOs do not see the benefit from creating a separate ancillary service for primary frequency response. In addition, as noted above, because the incremental cost to provide frequency response is minimal and because in most cases generators presently have this capability through governor controls, establishing the "right" level of compensation for frequency response could be quite contentious. Please see answer to question C.3 above.

7. When compensating for primary frequency response, should compensation be different inside and outside of RTOs/ISOs?

Please see answer to question C.3 above. As already stated, the Indicated ISOs/RTOs believe that a new separate compensation mechanism is not necessary. However, if the Commission deems it necessary to develop new separate compensation mechanisms, all Balancing Authorities, not only ISOs and RTOs, should be required to develop such mechanisms because all Balancing Authorities need primary frequency response. Conversely, if it can be simply required to be a cost of reliable generator operation (similar to, for example, maintenance, staffing, metering, software, and communications) that should be priced into generator operation in non-ISO/RTO areas, then the same should be true in the ISO/RTO regions.

8. What procurement requirements or compensation mechanisms could be used for primary frequency response from stored energy resources? When considering requirements or compensation for stored energy resources, how should possible additional costs or other concerns be addressed?

As already stated, the Indicated ISOs/RTOs believe that a new separate compensation mechanism is not necessary. Please see answer to question C.3 above.

III. CONCLUSION

The Indicated ISOs/RTOs respectfully request that the Commission consider their answers to the questions posed in the NOI.

Respectfully submitted,

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